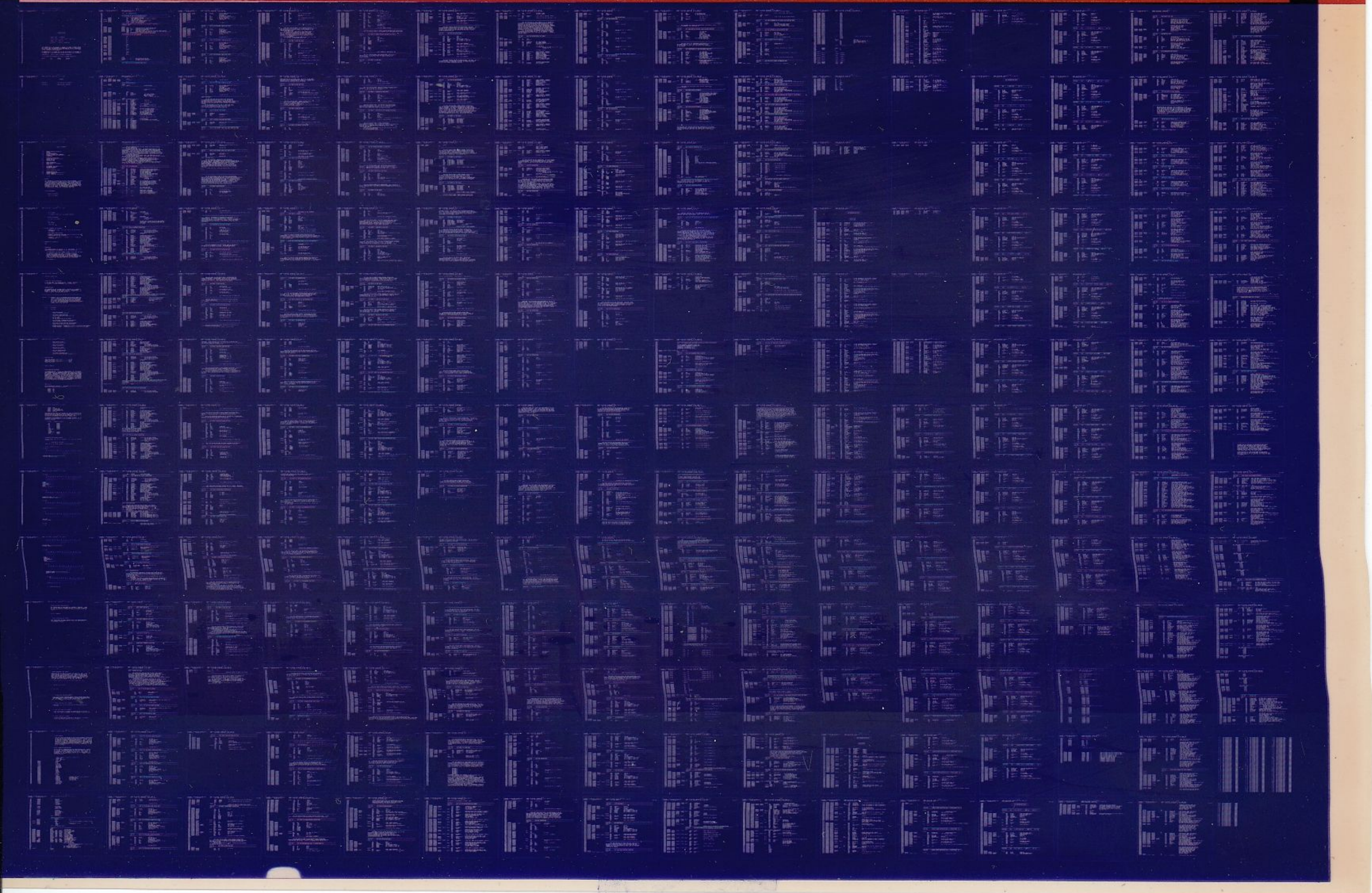
KDF11-B

11/23B CPU CLSTR
CJKDJB0

AH-T039B-MC
FICHE 1 OF 3



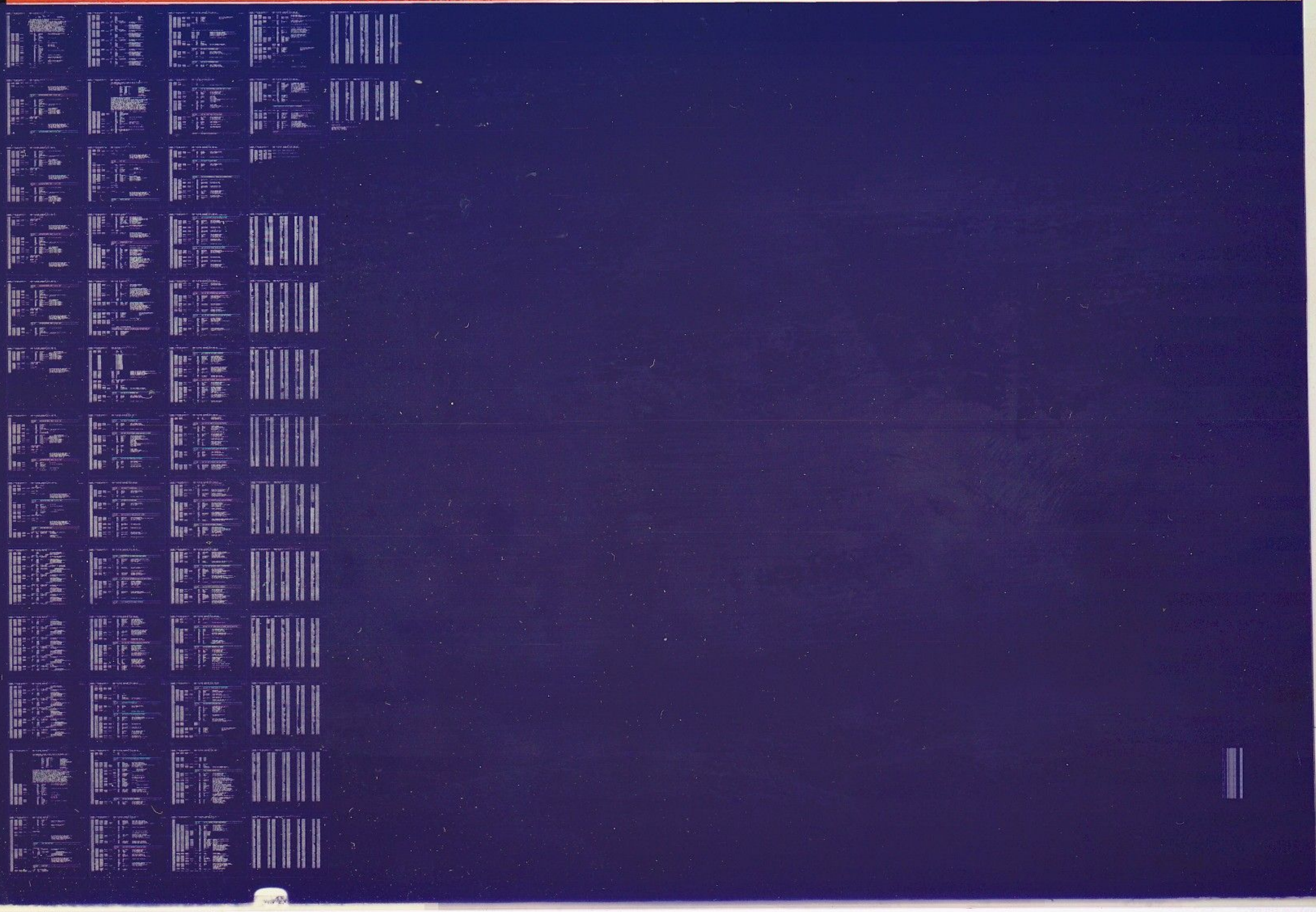
KDF11-B

11/23B CPU CLSTR
CJKDJB0

AH-T039B-MC
FICHE 2 OF 3

KDF11-B 11/23B CPU CLSTR
CJKDJB0

AH-T039B-MC
FICHE 3 OF 3



.REM_

IDENTIFICATION

PRODUCT CODE: AC-T038B-MC

PRODUCT NAME: CJKDJB0 11/23B CPU CLSTR DIAG

PRODUCT DATE: APRIL-82

MAINTAINER: DIAGNOSTIC ENGINEERING

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                                                    HISTORY
                                                    -------

                        REVISION A                  FIRST RELEASE OF DIAGNOSTIC

                        REVISION B                  CORRECTED MEDIA PROBLEMS
```

TABLE OF CONTENTS

1.0 ABSTRACT

THIS PROGRAM IS A GO-NOGO TEST FOR THE 11/23-B CPU BOARD. IT TESTS THE CPU INCLUDING EIS, THE MMU, THE FPP, THE LTC AND BOTH SLU'S. IT DOES NOT CONTAIN THE CAPABILITIES OF SCOPE LOOPING, ERROR RECOVERY OR PRINTING OF ERROR INFORMATION. ERROR HALTS DO INDICATE WHICH DEVICE FAILED TO ALLOW THE TECHNICIAN TO DETERMINE WHICH DIAGNOSTIC TO USE TO FIX THE BOARD OR WHAT FIELD REPLACEABLE UNIT (FRU) MAY FIX THE BOARD. THE PROGRAM WILL RUN UNDER THE ACT AND APT MANUFACTURING SYSTEMS AND IS CHAINABLE UNDER XXDP.

1.1 SYSTEM REQUIREMENTS

A. HARDWARE REQUIREMENTS

- KDF11-B CPU MODULE

- 32K OF MEMORY

- THE SECOND SLU MUST HAVE TURN AROUND CONNECTOR.

B. SOFTWARE ENVIRONMENTS

- APT (MULTI-CPU TESTER)

- ACT

- XXDP (SLIDE)

- STAND-ALONE

1.2 RELATED DOCUMENTS AND STANDARDS

- ASSEMBLED WITH SYSMAC; SEE FIRST PAGE OF LISTING FOR REVISION NUMBER.

- MXXXX MODULE SPECIFICATION

- DIAGNOSTIC ENGINEERING FUNCTIONAL SPECIFICATION FOR SPECIAL MANUFACTURING TEST BGI-79-003-00-U.

- DIAGNOSTIC ENGINEERING STANDARDS AND CONVENTIONS 175-003-009-02.

1.3 PREREQUISITE DIAGNOSTICS

NONE

1.4 ASSUMPTIONS

THIS PROGRAM ASSUMES THE MACHINE IS UP SUFFICIENTLY TO ALLOW PROPER OPERATION OF THE MICRO-ODT OF THE DCF11-AA CHIP SET.

THE SYSTEM MUST HAVE PARITY MEMORY LOCATED IN THE FIRST 32K BLOCK.

THE SOFTWARE ASSUMES THAT THERE IS NO MEMORY OR DEVICES LOCATED AT OR BEYOND ADDRESS BIT 17 (64 KW). IF MEMORY IS THERE THE PROGRAM WILL FAIL WHEN IN THE EXTENDED ADDRESS TESTS. IF BIT 7 IS SET IN THE SWITCH REGISTER (176) THIS FAILURE CAN BE PREVENTED SINCE THAT PARTICULAR TEST WILL BE BYPASSED.

SEE PARAGRAPH 2.2.

2.0 OPERATING INSTRUCTIONS

2.1 LOADING AND STARTING PROCEDURES

TO LOAD AND START THIS PROGRAM USE THE STANDARD PROCEDURES FOR THE DIAGNOSTIC SOFTWARE ENVIRONMENT THAT IS BEING USED.

2.2 PROGRAM OPTIONS

THIS PROGRAM USES THE SOFTWARE SWITCH LOCATION 176 IF PROGRAM IS NOT BEING RUN UNDER APT MODE (BIT 0 SET OF LOCATION $ENV). IF PROGRAM IS BEING RUN IN APT MODE THE LOCATION $SWREG IN THE APT ETABLE IS USED TO STORE OPERATING SWITCHES.

****

WARNING****THIS PROGRAM IS SET TO DO MINIMUM TESTING UNLESS CORRECTIVE ACTION IS TAKEN VIA THE SOFTWARE SWITCH REGISTER (176). BITS 1, 6,7-10 HAVE BEEN SET UP SUCH THAT THE PROGRAM WILL BYPASS CERTAIN TESTS UNLESS THE SWITCH REGISTER BIT IS SET. THIS CONDITION ALSO APPLIES WHEN UNDER CONTROL OF APT. THE APT SWITCH REGISTER, LOCATION 1022, MUST BE CORRECTLY SET AT APT LOAD TIME.

****

BIT #	DEFINITION
15-11	NOT USED
10	1 - TEST E102 SWITCHES 0 - INHIBIT TESTING E102 SWITCHES
9	1 - TEST PARITY ERROR DETECTION 0 - INHIBIT TESTING PARITY ERROR DETECTION
8	1 - USE THE Q22BE 0 - USE THE QBE IN PLACE OF THE Q22BE
7	1 - TEST THE UPPER 5 ADDRESS BITS FOR TIME OUT 0 - INHIBIT TESTING THE UPPER 5 ADRS BITS
6	1 - TEST USING A Q BUS EXERCISER (QBE OR Q22BE) 0 - INHIBIT TESTS THAT USE A Q BUS EXERCISER
5	0 - PROGRAM RESERVED -- PROGRAM WILL CLEAR IF CIS CHIP SET NOT ON BOARD 1 - PROGRAM RESERVED -- PROGRAM WILL SET IF CIS CHIP SET IS ON BOARD

```
                                        4       0 - TEST SLU2 OF 11/23-B
                                                1 - INHIBIT TESTING OF SLU2

                                        3       0 - TEST LTC OF 11/23-B
                                                1 - INHIBIT TESTING OF LTC

                                        2       0 - TEST SLU1 OF 11/23-B
                                                1 - INHIBIT TESTING OF SLU1

                                        1       1 - TEST FPP INSTRUCTION SET
                                                0 - INHIBIT TESTING OF FPP

                                        0       0 - TEST MEMORY MANAGEMENT UNIT
                                                1 - INHIBIT TESTING OF MMEMORY MANAGEMENT UNIT


                                2.3  EXECUTION TIMES

                                     FIRST PASS RUNTIME (WORST CASE).....45 SEC
                                     LONGEST TEST TIME.....30 SEC
                                     ADDITIONAL RUNTIME (EXTRA UNITS).....NONE
                                     LONGEST PASS TIME.....45 SEC


                                3.0  ERROR INFORMATION


                                3.1  ERROR REPORTING PROCEDURES

                                     THE PROGRAM DOES NOT  TYPE OUT ANY ERROR REPORTS  OF  ITS OWN BUT
                                     TAKES ADVANTAGE OF THE  HARDWARE FEATURE THAT TYPES THE PC WHEN A
                                     HALT OCCURS.  WHEN AN ERROR IS DETECTED  THE PROGRAM JUMPS TO ONE
                                     OF SEVEN HALT  ROUTINES.  THE ROUTINES SIMPLY  MOVE A FATAL ERROR
                                     NUMBER INTO LOCATION $FATAL, SET THE FATAL ERROR FLAG IN LOCATION
                                     $MSGTY AND EITHER HALT OR IF ON APT DO A BRANCH DOT. THE OPERATOR
                                     HAS THREE WAYS  TO DETERMINE THE FAILING  DEVICE; 1) BY EXAMINING
                                     LOCATION $FATAL, 2) BY DETERMINING THE  HALT ADDRESS  AND LOOKING
                                     UP THE ADDRESS IN THE LISTING AND 3) BY EXAMINING LOCATION $TESTN
                                     WHICH WILL CONTAIN THE TEST NUMBER BEING EXECUTED.


                                3.2  ERROR HALTS

                                     FOR DISCUSSION SEE SECTION 3.1.  THE LABELS FOR THE HALTS AND THE
                                     DEVICE THEY INDICATE HAVING FAILED ARE:

                                          CPUHLT:  CPU
                                          MMUHLT:  MMU
                                          FPPHLT:  FPP
                                          LTCHLT:  LTC
                                          SL1HLT:  SLU1
```

```
                        SL2HLT:  SLU2
                        EXADHT:  EXT ADRS TEST
                        COMHLT:  SYSTEM INTERACTION
                        Q22HLT:  Q22BE INTERRUPT TEST
                        BDVHLT:  BDV TEST

                    UPON RECEIVING THE ERROR HALT ADDRESS (PC) FROM THE MICRO-ODT THE
                    OPERATOR CAN LOOK UP THESE TAGS IN THE SYMBOL TABLE AT THE END OF
                    THE LISTING TO DETERMINE WHICH HALT WAS EXECUTED.  NOTE:  THE  PC
                    SUPPLIED BY THE MICRO-ODT WILL BE THE HALT ADDRESS PLUS 2.

                    THE OPERATOR CAN DETERMINE WHICH TEST THE ERROR  OCCURRED  IN  BY
                    EXAMINING  LOCATION "$TESTN".  THE TEST NUMBERS EQUATE TO FAILING
                    DEVICES AS FOLLOWS:

                         DEVICE      CONTENTS OF $TESTN

                          CPU              000001
                          MMU              000002
                          FPP              000003
                          SLU1             000004
                          LTC              000005
                          SLU2             000006
                          EXTND ADRS       000007
                          TESTS
                          SYSTEM
                          INTERACTION      000010
                          Q22BE            000011
                          BDV TESTS        000012



               4.0  PERFORMANCE AND PROGRESS REPORTS

                    THE ONLY REPORT TYPED BY THIS PROGRAM IS  THE  END  PASS  MESSAGE
                    WHICH IS:

                              CJKDJB END OF PASS #XXX

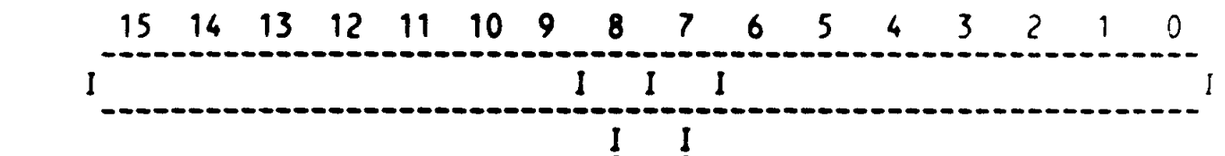
                    WHERE XXX IS THE DECIMAL NUMBER OF PASSES COMPLETED.


               5.0  DEVICE INFORMATION TABLES

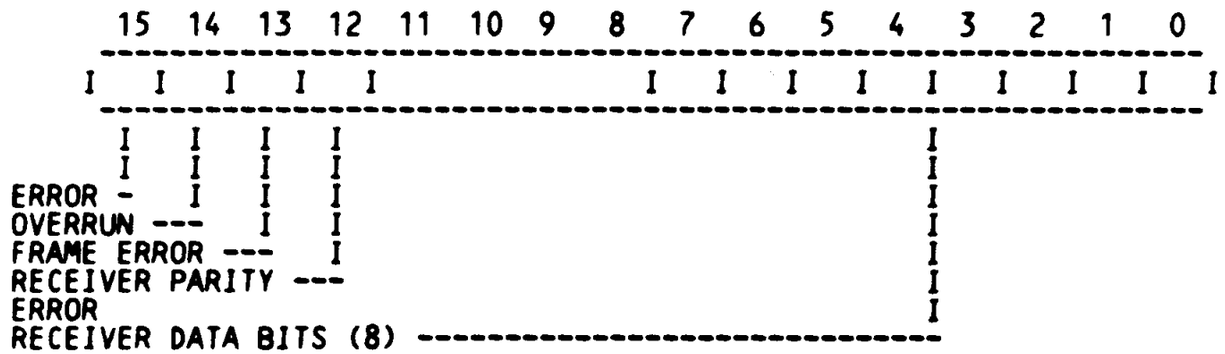
               SLU1 RCSR

                     15  14  13  12  11  10  9   8   7   6   5   4   3   2   1   0
                    ---------------------------------------------------------------
                    I                               I   I   I                   I
                    ---------------------------------------------------------------
                                                    I   I
                                                    I   I
                     RECEIVER DONE ------------------   I
                     RECEIVER INTERRUPT ENABLE ----------
```

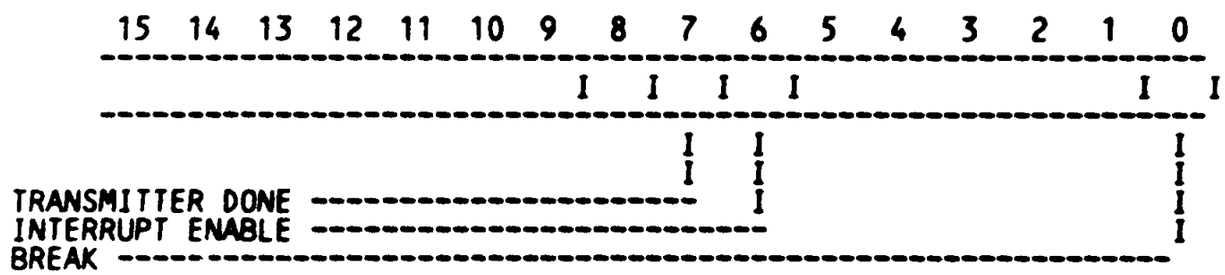
```
347
348                     SLU1 RBUF
349
350                           15  14  13  12  11  10  9   8   7   6   5   4   3   2   1   0
351                          ---------------------------------------------------------------
352                         I   I   I   I   I                   I   I   I   I   I   I   I   I   I
353                          ---------------------------------------------------------------
354                           I   I   I   I                                   I
355                           I   I   I   I                                   I
356                     ERROR-    I   I   I                                   I
357                     OVERRUN ---   I   I                                   I
358                     FRAME ERROR ---   I                                   I
359                     RECEIVE PARITY ----                                   I
360                     ERROR                                                 I
361                     RECEIVED DATA BITS (8) ---------------------------------
362
363
364
365                     SLU1 XCSR
366
367                           15  14  13  12  11  10  9   8   7   6   5   4   3   2   1   0
368                          ---------------------------------------------------------------
369                       I                           I   I   I                           I
370                          ---------------------------------------------------------------
371                                                   I   I
372                     TRANSMITTER READY ----------------   I                   I
373                     TRANSMITTER INTERRUPT ENABLE ----------                   I
374
375
376                     SLU1 XBUF
377
378                           15  14  13  12  11  10  9   8   7   6   5   4   3   2   1   0
379                          ---------------------------------------------------------------
380                         I                               I   I   I   I   I   I   I   I   I
381                          ---------------------------------------------------------------
382                                                                   I
383                                                                   I
384                     TRANSMITTER DATA BITS (8) ---------------------
385
386
387
388                     LTC CSR
389
390                           15  14  13  12  11  10  9   8   7   6   5   4   3   2   1   0
391                          ---------------------------------------------------------------
392                       I                                   I   I
393                          ---------------------------------------------------------------
394                                                               I
395                                                               I
396                     LINE CLOCK
397                     INTERRUPT ENABLE ------------------------
398
399
400
401                     SLU2 RCSR
402
```



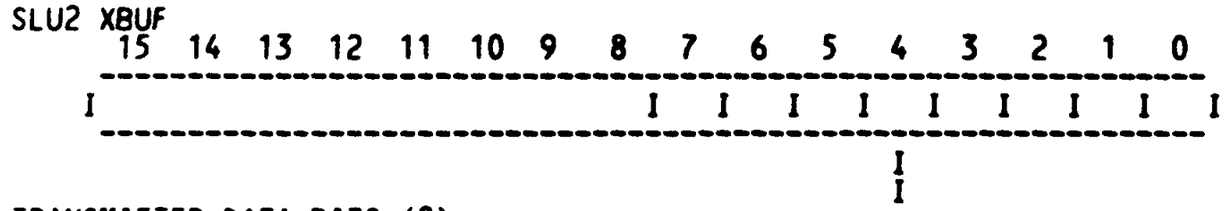
SLU2 RBUF



SLU2 XCSR



SLU2 XBUF



6.0 PROGRAM DESCRIPTION

6.1 PROGRAM EXECUTION CHARACTERISTICS

THIS PROGRAM RUNS THE SAME UNDER ALL DIAGNOSTIC MONITORS. WHEN THE TEST IS STARTED AT ADDRESS 200 OCTAL THE TESTING IS DONE AND ON COMPLETION THE TITLE IS TYPED AS PART OF THE END OF PASS MESSAGE.

6.2 SUB-TEST SUMMARIES

6.2.1 CENTRAL PROCESSING UNIT SUBTEST -

THESE TESTS CHECK THE BASIC INSTRUCTION SET AND ADDRESSING MODES, THE EXTENDED ELEVEN INSTRUCTION SET (EIS) AND TRAPS TESTING. IT IS EQUIVALENT TO CJKDB.

6.2.2 MEMORY MANAGEMENT UNIT SUBTEST -

THESE TESIS ARE THE SAME AS IN CJKDA, THE KEF11-AA TEST. THE PROGRAM BEGINS BY TESTING SOME OF THE INTERNAL CPU DATA AND ADDRESS PATHS AND ADDRESS DETECTION LOGIC. NEXT THE MEMORY MANAGEMENT REGISTERS ARE CHECKED FOR DATA RELIABILITY, THEN RELOCATION CAPABILITIES (FORMATION OF A PHYSICAL ADDRESS FROM A VIRTUAL ADDRESS AND ASSOCIATED PAGE DESCRIBTOR (PDR) INFORMATION). FINALLY THE ABORT AND STATUS SEGMENTS OF THE LOGIC ARE CHECKED.

6.2.3 EXTENDED ADDRESS BIT TESTING AND PARITY ERROR LOGIC TEST

6.2.4 Q22BE BR LEVEL TESTING

6.2.5 BDV TESTS

6.2.6 FLOATING POINT PROCESSOR SUBTEST -

THE FLOATING POINT PROCESSOR SUBTEST CHECKS FLOATING POINT REGISTERS FIRST USING A LIMITED NUMBER OF FLOATING POINT INSTRUCTIONS. IT THEN VERIFIES THE REST OF THE FLOATING POINT INSTRUCTION SET USING A NUMBER OF DATA PATTERNS FOR EACH INSTRUCTION.

6.2.7 SERIAL LINE UNIT (SLU1) SUBTEST -

THESE TESTS CHECK THE SLU'S REGISTERS FOR ADDRESSING AND DATA HANDLING.

6.2.8 LINE TIME CLOCK (LTC) SUBTEST -

FIRST THE REGISTER IS CHECKED FOR ADDRESSING AND BIT SETTING CAPABILITIES THEN THE INTERRUPT LOGIC IS CHECKED. THERE IS ALSO A

6.2.9 SERIAL LINE UNIT 2 SUBTEST -

THE TESTING DONE HERE IS SIMILIAR AS FOR THE SLU1. AN EXTERNAL JUMPER, TURN AROUND CONNECTOR, MUST BE PRESENT.

```
                                6.2.10  BLAST SUBTEST

                                        THIS TEST CHECKS THE ABILITY OF THE 11/23-B TO HANDLE  SYSTEM INTER-
                                        ACTION. THE CPU HAS TO HANDLE DEVICES AT DIFFERENT PRIORITY LEVELS
                                        AND ARBITRATE BETWEEN THEM AND ITS OWN PRIORITY.  THE TEST SETS UP
                                        ALL DEVICES TO INTERRUPT THEN ENABLES THEM ALL AT ONCE.  THE SLU'S
                                        TRANSFER DATA UNTIL THEY TRANSFER 400(8) BYTES OR UNTIL ONE SECOND
                                        (60 TICKS)  OF THE LINE CLOCK HAS BEEN RECEIVED.  THE PROGRAM THEN
                                        VERIFIES THE NUMBER OF TRANSMTTER INTERRUPTS IS EQUAL TO THE  NUM-
                                        BER OF RECEIVER INTERRUPTS.  FINALLY THE DATA TRANSFERRED  BY EACH
                                        DEVICE IS CHECKED.


                                6.3  SPECIAL SUBROUTINE DESCRIPTIONS

                                     THE ONLY SPECIAL SUBROUTINES ARE THE ERROR ROUTINES EACH  SUBTEST
                                     HAS  IS OWN.  THE ROUTINES SIMPLY SET THE FATAL ERROR FLAG IN THE
                                     APT MAILBOX AND EITHER "BRANCH SELF" OR "HALT".  THIS  CHOICE  IS
                                     DETERMINED  IN  THE  INITIALIZE  PORTION  OF THE PROGRAM AND IS A
                                     "BRANCH SELF" IF RUNNING UNDER APT OR A "HALT" IF  RUNNING  UNDER
                                     ANY OTHER MONITOR.

                                -


                                        .TITLE  CJKDJB0  11/23-B CPU CLUSTER DIAG.
                                        .ENABLE ABS
                                        .NLIST  CND,MC,MD
                                        .LIST   ME
000240                                  SCOPE=NOP
000007                                  R7=%7
000006                                  R6=%6
177776                                  PS=177776
177564                                  TPS=177564
177566                                  TPB=177566
140000                                  USRM=140000
030000                                  PUSRM=30000
000006                                  SP=%6
000006                                  R6=%6
000003                                  TAB=%3
000001                                  LAST=%1
000005                                  FIRST=%5
000002                                  R2=%2
000000                                  HLT=HALT
000003                                  TRT=3
000004                                  ITRAP5=4
000004                                  RTRAP5=4                ;RESERVED INST AND ILLEGAL ADDRESSES
000014                                  RTRAP4=14               ;FOR TRACE TRAP
000030                                  RTRAP3=30               ;FOR EMULATOR TRAP
000020                                  RTRAP2=20               ;FOR IOT TRAP
000034                                  RTRAP1=34               ;FOR TRAP INST
177564                                  TTCSR=177564
177560                                  TRCSR=177560
177562                                  TKB=177562
177566                                  TPB=177566
```

```
                                        BELL=240
                                        NOP=240
                                        STATUS=177776
                                        TRAPA=77
                                        RTRAP=10
                                        ILLA=004700
                                        ILLB=100

                                        PCR=177520
                                        LSREG=177524
                                        RWREG=177522

                                        CC=177776
                                        KERSTK=STBOT
                                        USESTK=STBOT-200
                                        EMTA=104377
                                        TRAPC=104777
                                        APTENV=1
                                .SBTTL  ACT11 HOOKS

                                ;*******************************************************************************
                                ;HOOKS REQUIRED BY ACT11
                                        $SVPC=.                 ;SAVE PC
                                        .=46
                                        $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                                        .=52
                                        .WORD   0               ;;2)SET LOC.52 TO ZERO
                                        .=$SVPC                 ;; RESTORE PC
                                        .=1000
                                .SBTTL  APT MAILBOX-ETABLE

                                ;*******************************************************************************
                                .EVEN
001000                          $MAIL:                          ;;APT MAILBOX
001000  000000                  $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
001002  000000                  $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
001004  000000                  $TESTN: .WORD   ATESTN          ;;TEST NUMBER
001006  000000                  $PASS:  .WORD   APASS           ;;PASS COUNT
001010  000000                  $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
001012  000000                  $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
001014  000000                  $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
001016  000000                  $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
001020                          $ETABLE:                        ;;APT ENVIRONMENT TABLE
001020     000                  $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
001021     000                  $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
001022  000000                  $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
001024  000000                  $USWR:  .WORD   AUSWR           ;;USER SWITCHES
001026  000000                  $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
                                ;*                              BITS 15-11=CPU TYPE
                                ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                ;*                                      11/70=06,PDQ=07,Q=10
                                ;*                              BIT 10=REAL TIME CLOCK
                                ;*                              BIT  9=FLOATING POINT PROCESSOR
                                ;*                              BIT  8=MEMORY MANAGEMENT
001030                          $ETEND:
                                .MEXIT
```

```
                                                .SBTTL  APT PARAMETER BLOCK

                                                ;*************************************************************************
                                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                                ;*************************************************************************
001030                                                  .$X=.   ;;SAVE CURRENT LOCATION
000024                                                  .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                                         200     ;;FOR APT START UP
000044                                                  .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  001030                                         $APTHDR ;;POINT TO APT HEADER BLOCK
001030                                                  .=.$X   ;;RESET LOCATION COUNTER
                                                ;*************************************************************************
                                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                                ;INTERFACE SPEC.

001030                                          $APTHD:
001030  000000                                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001032  001000                                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
001034  000010                                  $TSTM:  .WORD   10      ;;RUN TIM OF LONGEST TEST
001036  000025                                  $PASTM: .WORD   25      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001040  000000                                  $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001042  000014                                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
                                                ;*************************************************************************
                                                ;SOME POINTERS TO CPU TRAP HANDLERS
                                                ;*************************************************************************
000004                                                  .=4
000004  021336                                          TO4
000006  000000                                          0
000010  021340                                          TO10
000012  000000                                          0
000014  021342                                          TO14
000016  000000                                          0
000020  021344                                          TO20
000022  000000                                          0
000030                                                  .=30
000030  021346                                          TO30
000032  000000                                          0
000034  021350                                          TO34
000036  000000                                          0
000114                                                  .=114
000114  021352                                          TO114
000116  000000                                          0
000244                                                  .=244
000244  021354                                          TO244
000246  000000                                          0
000250  021356                                          TO250
000252  000000                                          0

000172                                          .=172
000172  000000                                  MTFLAG:         0       ;MULTI-TESTER ACTIVE BIT
000174  000000                                  DISPREG:        0       ;SOFTWARE DISPLAY REGISTER
000176  000000                                  SWREG:          0       ;SOFTWARE SWITCH REGISTER

                                                ;*************************************************************************
                                                ;DATA TABLE FOR USE IN ADDRESSING MODE TESTS
                                                ;*************************************************************************
```

```
                000370                          .=370
000370  000000  000000  000000                  0,0,0,0,0,0
000376  000000  000000  000000
000404  000001  000001  177777                  1,1,-1
                                        ;*****************************************************************************************
                                        ;SET UP STARTING ADDRESS
                001000                  .=1000
001000  000000                          STBOT:  .WORD 0                         ;STACK POINTER
                                        ;* ***************************************************************
                000510                          .=510                           ;Q22BE DEVICE VECTOR
                                                                                ;AREA
                000200                          .=200
000200  000167  000774                          JMP     START
000204  012706  001000                          MOV     #STBOT,R6               ;SET STACK POINTER
000210  012702  001004                          MOV     #$TESTN,R2              ;SET MAILBOX POINTER
000214  000137                          JMP     @(PC)+                          ;JUMP TO SUBTEST
000216  000000                          0                                       ;ADDR. OF SUBTEST GOES HERE
                001200                  .=1200
                                        .SBTTL **STARTING OF CPU TEST **
001200  032737  000001  001020          START:  BIT     #1,@#$ENV               ;UNDER APT
001206  001004                          BNE     CONTIN
001210  012700  133431                  MOV     #STRMSG,R0                      ;START MESSAGE
001214  004767  132110                  JSR     PC,TYPE
001220  012737  000000  001006          CONTIN: MOV     #0,@#$PASS      ;CLEAR PASS COUNT
001226  012737  133264  000024          RESTRT: MOV     #PWRDN,@#24             ;SET UP FOR POWER FAIL
001234  012706  001000                  MOV     #STBOT,R6       ;SET UP STACK
001240  012737  001270  000004          MOV     #1$,@#4         ;SET UP FOR TIMEOUT IF NO MULTI TESTER
001246  012737  000340  000006          MOV     #340,@#6
001254  012737  000002  164000          MOV     #2,@#164000     ;SET BIT1 FOR MULTI TESTER
001262  012737  000001  000172          MOV     #1,@#MTFLAG     ;SET FLAG TO INDICATE MULTI-TESTER
001270  012737  021336  000004  1$:     MOV     #TO4,@#4                ;SET TRAP CATCHER
001276  012737  000000  000006          MOV     #0,@#6          ;SET HALT BACK IN LOCATION 6
001304  012706  001000                  MOV     #STBOT,R6       ;INITIALIZE STACK POINTER
001310  012737  000001  001004          MOV     #1,@#$TESTN     ;SET TEST NUMBER TO 1
001316  012737  000000  001002          MOV     #0,@#$FATAL     ;CLEAR ERROR INDICATOR
001324  012737  000000  001000          MOV     #0,@#$MSGTY     ;CLEAR MESSAGE TYPE(FOR APT)

001332  005067  176166                  CLR     LSREG           ;THIS WILL TURN ON THE 4 LEDS

001336  105737  001020                  TSTB    @#$ENV          ;RUNNING ON APT
001342  001036                          BNE     TS1             ;IF YES DO BRANCH SELF ON ERROR
001344  012737  000000  002164          MOV     #0,@#CPUHLT     ;IF NOT THEN PUT A HALT IN ON ERROR
001352  012737  000000  050470          MOV     #0,@#MMUHLT
001360  012737  000000  051404          MOV     #0,@#EXADHT
001366  012737  000000  053214          MOV     #0,@#Q22HLT
001374  012737  000000  124532          MOV     #0,@#FPHLT
001402  012737  000000  126674          MOV     #0,@#LTCHLT
001410  012737  000000  125754          MOV     #0,@#SL1HLT
001416  012737  000000  131540          MOV     #0,@#SL2HLT
001424  012737  000000  132504          MOV     #0,@#COMHLT
001432  012737  000000  054472          MOV     #0,@#BDVHLT

```

```
                                ;*****************************************************************************************
                                ;
                                ;       THIS TEST EXECUTES EVERY POSSIBLE BRANCH WITH EVERY POSSIBLE
                                ;CONDITION CODE COMBINATION.
                                ;       THE ROUTINE USES TWO TABLES.  THE BRANCH TABLE HOLDS ALL THE
                                ;POSSIBLE BRANCH INSTRUCTIONS, THE OTHER TABLE (YNTAB) HOLDS BIT MAPS FOR
                                ;EACH BRANCH.  A ONE IN THE BIT MAP INDICATES THAT THE CORRESPONDING
                                ;BRANCH INSTRUCTION SHOULD BRANCH FOR THE CONDITION CODE SETTING WHICH
                                ;CORRESPONDS TO THE BIT POSITION WITHIN THE MAP.  FOR EXAMPLE IF THE LEFT
                                ;MOST BIT IS A ONE THEN THE CORRESPONDING BRANCH INSTRUCTION SHOULD BRANCH
                                ;WHEN THE CONDITION CODES ARE 0.
                                ;       THE ROUTINE CONSISTS OF NESTED LOOPS; THE OUTER LOOP SETS UP
                                ;ALL THE POSSIBLE BRANCH INSTRUCTIONS.  THE INNER LOOP SETS UP EVERY POSSIBLE
                                ;CONDITION CODE FOR EACH BRANCH.
                                ;       THE BIT MAP IS USED TO SET THE ADDRESS LOCATION IN TWO
                                ;JUMP MODE 3 INSTRUCTIONS.  THE ADDRESSES ARE CHANGED TO ALLOW THE
                                ;PROGRAM TO CONTINUE OR JUMP TO AN ERROR ROUTINE DEPENDING UPON
                                ;WHETHER IT HANDLED THE BRANCH INSTRUCTION CORRECTLY.
                                ;       AT ANY ERROR HALT, LOCATION, BRH, HOLDS THE BRANCH INSTRUCTION
                                ;UNDER TEST AND LOCATION, CC, HOLDS THE VALUE OF THE CONDITION CODES
                                ;AT THE TIME THE BRANCH WAS EXECUTED.
                                ;
                                ;*****************************************************************************************
                                ;TEST 1 TEST THE BRANCH ROM
                                ;*****************************************************************************************
001440                          TS1:
001440  012700  021242          SETUP:  MOV     #BRTAB,R0       ;INITIALIZE BRANCH TABLE POINTER
001444  012704  021300                  MOV     #YNTAB,R4       ;INITIALIZE YES/NO BRANCH MAP POINTER
001450  012767  000017  000130          MOV     #15.,BRCT       ;INITIALIZE BRANCH TABLE COUNT
001456  012067  000110          SETBR:  MOV     (R0)+,BRH       ;GET NEXT BRANCH INST.
001462  012401                  MOV     (R4)+,R1        ;GET NEXT BRANCH MAP
001464  012767  177777  000074          MOV     #-1,CC1         ;INITIALIZE CONDITION CODE VALUE
001472  012703  000020                  MOV     #16.,R3         ;INITIALIZE CONDITION CODE COUNT
001476  005267  000064          SETCC:  INC     CC1             ;SET FOR NEXT CC VALUE
001502  032701  100000                  BIT     #100000,R1      ;SEE IF SHOULD BR W/ THESE CC'S
001506  013705  177776                  MOV     @#177776,R5     ;SIMULATE A JNE
001512  042705  177773                  BIC     #177773,R5      ;       (JUMP NOT EQUAL)
001516  000165  001522                  JMP     .+4(R5)         ;       TO SET2BR
001522  000167  000020                  JMP     SET2BR
001526  012767  001610  000042          MOV     #CONT,NBR       ;SET TO CONTINUE IF NO BRANCH
001534  012767  001604  000040          MOV     #ER,YBR         ;SET TO REPORT ERROR IF BRANCH
001542  000167  000014                  JMP     AROUN           ;GO AROUND OPPOSITE CONDITION
001546  012767  001604  000022  SET2BR: MOV     #ER,NBR         ;SET TO REPORT ERROR IF NO BRANCH
001554  012767  001610  000020          MOV     #CONT,YBR       ;SET TO CONTINUE IF BRANCH
001562  006101                  AROUN:  ROL     R1              ;UPDATE BIT MAP
001564  012737                          MOV     (PC)+,@(PC)+    ;SET CONDITION CODE
001566  000000                  CC1:    0                       ;NEW CC VALUE GOES HERE
001570  177776                          177776
001572  000000                  BRH:    0                       ;BRANCH INST. GOES HERE
001574  000137                          JMP     @(PC)+          ;THIS JUMP IF NO BRANCH
001576  000000                  NBR:    0                       ;WHERE TO GO IF NO BRANCH OCCURS
001600  000137                          JMP     @(PC)+          ;THIS JUMP IF BRANCH OCCURS
001602  000000                  YBR:    0                       ;WHERE TO GO IF BRANCH OCCURS
001604                          ER:
001604  000551                          BR      ERROR1          ;
```

```
 815  001606  000000                  BRCT:   0
 816  001610  005303                  CONT:   DEC     R3              ;CC'S DONE?
 817  001612  013705  177776                  MOV     @#177776,R5     ;SIMULATE A JNE
 818  001616  042705  177773                  BIC     #177773,R5      ;       (JUMP NOT EQUAL)
 819  001622  000165  001626                  JMP     .+4(R5)         ;       TO SETCC
 820  001626  000167  177644                  JMP     SETCC
 821  001632  005367  177750                  DEC     BRCT            ;BR'S DONE?
 822  001636  013705  177776                  MOV     @#177776,R5     ;SIMULATE A JNE
 823  001642  042705  177773                  BIC     #177773,R5      ;       (JUMP NOT EQUAL)
 824  001646  000165  001652                  JMP     .+4(R5)         ;       TO SETBR
 825  001652  000167  177600                  JMP     SETBR
 826  001656  012700  000357                  MOV     #357,R0         ;IF THIS TEST IS DONE SET UP R0 FOR THE NEXT
 827                                                                  ;SEVEN TESTS. THIS IS SAVING 4 LOCATIONS PER
 828                                                                  ;TEST WHICH I NEED BECAUSE BRANCHES WERE OUT
 829                                                                  ;OF BOUNDS.
 830
 831
 832                                      ;*****************************************************************************
 833                                      ;TEST 2 TEST TRAP OF RESERVED INSTRUCTION
 834                                      ;*****************************************************************************
 835  001662                              TS2:
 836  001662  012706  001000                  MOV     #STBOT,SP       ;INITIALIZE THE STACK POINTER
 837  001666  012767  001710  176114          MOV     #1$,RTRAP               ;SET UP NEW PC IN VECTOR
 838  001674  010067  176112                  MOV     R0,RTRAP+2              ;SET UP NEW PSW IN VECTOR
 839  001700  005067  176072                  CLR     STATUS          ;CLEAR PRESENT (OLD) STATUS
 840  001704  000077                          TRAPA                   ;DO TRAP
 841  001706                              8$:
 842  001706  000510                          BR      ERROR1          ;INSTRUCTION FAILED TO TRAP
 843  001710  020067  176062          1$:     CMP     R0,STATUS       ;IS NEW STATUS CORRECT
 844  001714  001105                          BNE     ERROR1          ;NEW STATUS WRONG
 845  001716  020627  000774          2$:     CMP     SP,#STBOT-4     ;DID STACK DECREMENT CORRECTLY
 846  001722  001102                          BNE     ERROR1          ;STACK DID NOT DECREMENT CORRECTLY
 847  001724  022767  001706  177042  3$:     CMP     #8$,STBOT-4     ;WAS PROPER PC SAVED
 848  001732  001076                          BNE     ERROR1          ;PROPER PC WAS NOT SAVED
 849  001734  005767  177036          4$:     TST     STBOT-2         ;WAS OLD PSW SAVED
 850  001740  001073                          BNE     ERROR1          ;WRONG PSW SAVED
 851  001742  062706  000004          5$:     ADD     #4,SP           ;RESET STACK POINTER
 852  001746  012767  001770  176034          MOV     #6$,RTRAP               ;SET UP NEW PC IN VECTOR
 853  001754  005067  176032                  CLR     RTRAP+2         ;SET UP NEW PSW IN VECTOR
 854  001760  010037  177776                  MOV     R0,@#STATUS     ;SET UP OLD STATUS FOR COMPARISON AFTER TRAP
 855  001764  000077                          TRAPA                   ;DO TRAP
 856  001766  000460                          BR      ERROR1          ;INSTRUCTION FAILED TO TRAP
 857  001770  005767  176002          6$:     TST     STATUS          ;IS NEW PSW CORRECT
 858  001774  001055                          BNE     ERROR1          ;NEW PSW WRONG
 859  001776  020067  176774          7$:     CMP     R0,STBOT-2      ;WAS OLD STATUS STORED
 860  002002  001052                          BNE     ERROR1          ;OLD STATUS WRONG
 861                                      ;*****************************************************************************
 862                                      ;TEST 3 TEST TRAP OF TRAP INSTRUCTION
 863                                      ;*****************************************************************************
 864  002004                              TS3:
 865  002004  012706  001000                  MOV     #STBOT,SP       ;INITIALIZE THE STACK POINTER
 866  002010  012767  002032  176016          MOV     #1$,RTRAP1              ;SET UP NEW PC IN VECTOR
 867  002016  010067  176014                  MOV     R0,RTRAP1+2             ;SET UP NEW PSW IN VECTOR
 868  002022  005067  175750                  CLR     STATUS          ;CLEAR PRESENT (OLD) STATUS
 869  002026  104400                          TRAP                    ;DO TRAP
 870  002030                              8$:
```

```
                                        BR      ERROR1          ;INSTRUCTION FAILED TO TRAP
002030  000437
002032  020067  175740          1$:   CMP     R0,STATUS       ;IS NEW STATUS CORRECT
002036  001034                        BNE     ERROR1          ;NEW STATUS WRONG
002040  020627  000774          2$:   CMP     SP,#STBOT-4     ;DID STACK DECREMENT CORRECTLY
002044  001031                        BNE     ERROR1          ;STACK DID NOT DECREMENT CORRECTLY
002046  022767  002030  176720  3$:   CMP     #8$,STBOT-4     ;WAS PROPER PC SAVED
002054  001025                        BNE     ERROR1          ;PROPER PC WAS NOT SAVED
002056  005767  176714          4$:   TST     STBOT-2         ;WAS OLD PSW SAVED
002062  001022                        BNE     ERROR1          ;WRONG PSW SAVED
002064  062706  000004          5$:   ADD     #4,SP           ;RESET STACK POINTER
002070  012767  002112  175736        MOV     #6$,RTRAP1              ;SET UP NEW PC IN VECTOR
002076  005067  175734                CLR     RTRAP1+2                ;SET UP NEW PSW IN VECTOR
002102  010037  177776                MOV     R0,@#STATUS     ;SET UP OLD STATUS FOR COMPARISON AFTER TRAP
002106  104777                        TRAPC                   ;DO TRAP WITH LOWER BYTE ALL ONES
002110  000407                        BR      ERROR1          ;INSTRUCTION FAILED TO TRAP
002112  005767  175660          6$:   TST     STATUS          ;IS NEW PSW CORRECT
002116  001004                        BNE     ERROR1          ;NEW PSW WRONG
002120  020067  176652          7$:   CMP     R0,STBOT-2      ;WAS OLD STATUS STORED
002124  001001                        BNE     ERROR1          ;OLD STATUS WRONG
002126  000434                        BR      CPUHLT+34       ;GET OVER ERROR CALL TO NEXT TEST IF NO ERROR
                                ;*******************************************************************************
                                ;THIS ERROR IS USED FOR THE ENTIRE CPU,TRAPS AND EIS PORTION OF
                                ;THIS TEST
                                ;*******************************************************************************
002130  012737  000001  001002  ERROR1: MOV     #1,@#$FATAL                     ;SET UP FATAL ERROR NUMBER
002136  012767  000001  176634          MOV     #1,$MSGTY                       ;SET FATAL ERROR FLAG
002144  032737  000001  001020          BIT     #1,@#$ENV                       ;UNDER APT
002152  001004                        BNE     CPUHLT                          ;YES, THEN DO NOT PRINT
002154  012700  002166                MOV     #CPUMSG,R0
002160  004767  131144                JSR     PC,TYPE                         ;TYPE MSG
002164  000777                CPUHLT: BR      .
                                
002166  040506  046111  042105  CPUMSG: .ASCIZ  /FAILED DURING CPU TESTS/<12><15>
002174  042040  051125  047111
002202  020107  050103  020125
002210  042524  052123  005123
002216  000015
                                .EVEN
                                ;*******************************************************************************
                                ;TEST 4 TEST TRAP OF IOT INSTRUCTION
                                ;*******************************************************************************
002220                          TS4:
002220  012706  001000                  MOV     #STBOT,SP       ;INITIALIZE THE STACK POINTER
002224  012767  002246  175566          MOV     #1$,RTRAP2              ;SET UP NEW PC IN VECTOR
002232  010067  175564                MOV     R0,RTRAP2+2             ;SET UP NEW PSW IN VECTOR
002236  005067  175534                CLR     STATUS          ;CLEAR PRESENT (OLD) STATUS
002242  000004                        IOT                     ;DO TRAP
002244                          8$:
002244  000731                        BR      ERROR1          ;INSTRUCTION FAILED TO TRAP
002246  020067  175524          1$:   CMP     R0,STATUS       ;IS NEW STATUS CORRECT
002252  001326                        BNE     ERROR1          ;NEW STATUS WRONG
002254  020627  000774          2$:   CMP     SP,#STBOT-4     ;DID STACK DECREMENT CORRECTLY
002260  001323                        BNE     ERROR1          ;STACK DID NOT DECREMENT CORRECTLY
002262  022767  002244  176504  3$:   CMP     #8$,STBOT-4     ;WAS PROPER PC SAVED
002270  001317                        BNE     ERROR1          ;PROPER PC WAS NOT SAVED
```

```
 927  002272  005767  176500          4$:     TST     STBOT-2         ;WAS OLD PSW SAVED
 928  002276  001314                          BNE     ERROR1          ;WRONG PSW SAVED
 929  002300  062706  000004          5$:     ADD     #4,SP           ;RESET STACK POINTER
 930  002304  012767  002326  175506          MOV     #6$,RTRAP2              ;SET UP NEW PC IN VECTOR
 931  002312  005067  175504                  CLR     RTRAP2+2                ;SET UP NEW PSW IN VECTOR
 932  002316  010037  177776                  MOV     R0,@#STATUS     ;SET UP OLD STATUS FOR COMPARISON AFTER TRAP
 933  002322  000004                          IOT                     ;DO TRAP
 934  002324  000701                          BR      ERROR1          ;INSTRUCTION FAILED TO TRAP
 935  002326  005767  175444          6$:     TST     STATUS          ;IS NEW PSW CORRECT
 936  002332  001276                          BNE     ERROR1          ;NEW PSW WRONG
 937  002334  020067  176436          7$:     CMP     R0,STBOT-2      ;WAS OLD STATUS STORED
 938  002340  001273                          BNE     ERROR1          ;OLD STATUS WRONG
 939                                  ;*******************************************************************************
 940                                  ;TEST 5 TEST TRAP OF EMT INSTRUCTION
 941                                  ;*******************************************************************************
 942  002342                          TS5:
 943  002342  012706  001000                  MOV     #STBOT,SP       ;INITIALIZE THE STACK POINTER
 944  002346  012767  002370  175454          MOV     #1$,RTRAP3              ;SET UP NEW PC IN VECTOR
 945  002354  010067  175452                  MOV     R0,RTRAP3+2             ;SET UP NEW PSW IN VECTOR
 946  002360  005067  175412                  CLR     STATUS          ;CLEAR PRESENT (OLD) STATUS
 947  002364  104000                          EMT                     ;DO TRAP
 948  002366                          8$:
 949  002366  000660                          BR      ERROR1          ;INSTRUCTION FAILED TO TRAP
 950  002370  020067  175402          1$:     CMP     R0,STATUS       ;IS NEW STATUS CORRECT
 951  002374  001255                          BNE     ERROR1          ;NEW STATUS WRONG
 952  002376  020627  000774          2$:     CMP     SP,#STBOT-4     ;DID STACK DECREMENT CORRECTLY
 953  002402  001252                          BNE     ERROR1          ;STACK DID NOT DECREMENT CORRECTLY
 954  002404  022767  002366  176362  3$:     CMP     #8$,STBOT-4     ;WAS PROPER PC SAVED
 955  002412  001246                          BNE     ERROR1          ;PROPER PC WAS NOT SAVED
 956  002414  005767  176356          4$:     TST     STBOT-2         ;WAS OLD PSW SAVED
 957  002420  001243                          BNE     ERROR1          ;WRONG PSW SAVED
 958  002422  062706  000004          5$:     ADD     #4,SP           ;RESET STACK POINTER
 959  002426  012767  002450  175374          MOV     #6$,RTRAP3              ;SET UP NEW PC IN VECTOR
 960  002434  005067  175372                  CLR     RTRAP3+2                ;SET UP NEW PSW IN VECTOR
 961  002440  010037  177776                  MOV     R0,@#STATUS     ;SET UP OLD STATUS FOR COMPARISON AFTER TRAP
 962  002444  104377                          EMTA                    ;DO TRAP WITH LOWER BYTE ALL ONES
 963  002446  000630                          BR      ERROR1          ;INSTRUCTION FAILED TO TRAP
 964  002450  005767  175322          6$:     TST     STATUS          ;IS NEW PSW CORRECT
 965  002454  001225                          BNE     ERROR1          ;NEW PSW WRONG
 966  002456  020067  176314          7$:     CMP     R0,STBOT-2      ;WAS OLD STATUS STORED
 967  002462  001222                          BNE     ERROR1          ;OLD STATUS WRONG
 968  002464  000401                          BR      ERROR2+2        ;WE MUST GET OVER ERROR CALL AT END OF THIS TEST
 969                                  ;*******************************************************************************
 970                                  ;THIS ERROR IS NEEDED BECAUSE BRANCHES IN TRAP TESTS BEYOND HERE CAN NOT
 971                                  ;REACH ERROR1.
 972                                  ;*******************************************************************************
 973  002466  000620                  ERROR2: BR      ERROR1
 974
 975
 976                                  ;*******************************************************************************
 977                                  ;TEST 6 TEST TRAP OF TRACE-TRAP INSTRUCTION
 978                                  ;*******************************************************************************
 979  002470                          TS6:
 980  002470  012706  001000                  MOV     #STBOT,SP       ;INITIALIZE THE STACK POINTER
 981  002474  012767  002516  175312          MOV     #1$,RTRAP4              ;SET UP NEW PC IN VECTOR
 982  002502  010067  175310                  MOV     R0,RTRAP4+2             ;SET UP NEW PSW IN VECTOR
```

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                                                H 2
 983  002506  005067  175264            CLR     STATUS          ;CLEAR PRESENT (OLD) STATUS
 984  002512  000003                    TRT                     ;DO TRAP
 985  002514                    8$:
 986  002514  000764                    BR      ERROR2          ;INSTRUCTION FAILED TO TRAP
 987  002516  020067  175254    1$:     CMP     R0,STATUS       ;IS NEW STATUS CORRECT
 988  002522  001361                    BNE     ERROR2          ;NEW STATUS WRONG
 989  002524  020627  000774    2$:     CMP     SP,#STBOT-4     ;DID STACK DECREMENT CORRECTLY
 990  002530  001356                    BNE     ERROR2          ;STACK DID NOT DECREMENT CORRECTLY
 991  002532  022767  002514  176234 3$:     CMP     #8$,STBOT-4     ;WAS PROPER PC SAVED
 992  002540  001352                    BNE     ERROR2          ;PROPER PC WAS NOT SAVED
 993  002542  005767  176230    4$:     TST     STBOT-2         ;WAS OLD PSW SAVED
 994  002546  001347                    BNE     ERROR2          ;WRONG PSW SAVED
 995  002550  062706  000004    5$:     ADD     #4,SP           ;RESET STACK POINTER
 996  002554  012767  002576  175232    MOV     #6$,RTRAP4              ;SET UP NEW PC IN VECTOR
 997  002562  005067  175230            CLR     RTRAP4+2                ;SET UP NEW PSW IN VECTOR
 998  002566  010037  177776            MOV     R0,@#STATUS     ;SET UP OLD STATUS FOR COMPARISON AFTER TRAP
 999  002572  000003                    TRT                     ;DO TRAP
1000  002574  000734                    BR      ERROR2          ;INSTRUCTION FAILED TO TRAP
1001  002576  005767  175174    6$:     TST     STATUS          ;IS NEW PSW CORRECT
1002  002602  001331                    BNE     ERROR2          ;NEW PSW WRONG
1003  002604  020067  176166    7$:     CMP     R0,STBOT-2      ;WAS OLD STATUS STORED
1004  002610  001326                    BNE     ERROR2          ;OLD STATUS WRONG
1005                            ;PDP-11 ILLEGAL AND ADDRESS INSTRUCTION TEST
1006                            ;ALL INSTRUCTIONS THAT ARE RESERVED
1007                            ;SHOULD TRAP TO LOCATION 4, AND THE
1008                            ;PC THAT POINTS TO THE TRAPPING INSTRUCTION
1009                            ;SHOULD BE PLACED ON THE STACK
1010
1011                            ;*****************************************************************************
1012                            ;TEST 7 TEST TRAP OF ILLEGAL INSTRUCTION
1013                            ;*****************************************************************************
1014  002612                    TS7:
1015  002612  012706  001000            MOV     #STBOT,SP       ;INITIALIZE THE STACK POINTER
1016  002616  012767  002640  175160    MOV     #1$,RTRAP5              ;SET UP NEW PC IN VECTOR
1017  002624  010067  175156            MOV     R0,RTRAP5+2             ;SET UP NEW PSW IN VECTOR
1018  002630  005067  175142            CLR     STATUS          ;CLEAR PRESENT (OLD) STATUS
1019  002634  000100                    JMP     %0                      ;DO TRAP
1020  002636                    8$:
1021  002636  000713                    BR      ERROR2          ;INSTRUCTION FAILED TO TRAP
1022  002640  020067  175132    1$:     CMP     R0,STATUS       ;IS NEW STATUS CORRECT
1023  002644  001310                    BNE     ERROR2          ;NEW STATUS WRONG
1024  002646  020627  000774    2$:     CMP     SP,#STBOT-4     ;DID STACK DECREMENT CORRECTLY
1025  002652  001305                    BNE     ERROR2          ;STACK DID NOT DECREMENT CORRECTLY
1026  002654  022767  002636  176112 3$:     CMP     #8$,STBOT-4     ;WAS PROPER PC SAVED
1027  002662  001301                    BNE     ERROR2          ;PROPER PC WAS NOT SAVED
1028  002664  005767  176106    4$:     TST     STBOT-2         ;WAS OLD PSW SAVED
1029  002670  001276                    BNE     ERROR2          ;WRONG PSW SAVED
1030  002672  062706  000004    5$:     ADD     #4,SP           ;RESET STACK POINTER
1031  002676  012767  002720  175100    MOV     #6$,RTRAP5              ;SET UP NEW PC IN VECTOR
1032  002704  005067  175076            CLR     RTRAP5+2                ;SET UP NEW PSW IN VECTOR
1033  002710  010037  177776            MOV     R0,@#STATUS     ;SET UP OLD STATUS FOR COMPARISON AFTER TRAP
1034  002714  000100                    JMP     %0                      ;DO TRAP
1035  002716  000660                    BR      ERROR2          ;INSTRUCTION FAILED TO TRAP
1036  002720  005767  175052    6$:     TST     STATUS          ;IS NEW PSW CORRECT
1037  002724  001260                    BNE     ERROR2          ;NEW PSW WRONG
1038  002726  020067  176044    7$:     CMP     R0,STBOT-2      ;WAS OLD STATUS STORED
```

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1039  002732  001255                          BNE     ERROR2          ;OLD STATUS WRONG
1040                                          ;*****************************************************************************
1041                                          ;TEST 10        TEST TRAP OF ALL ILLEGAL INSTRUCTION
1042                                          ;*****************************************************************************
1043  002734                                  TS10:
1044  002734  012706  001000                        MOV     #STBOT,SP       ;INITIALIZE THE STACK POINTER
1045  002740  012767  002762  175036                MOV     #1$,RTRAP5              ;SET UP NEW PC IN VECTOR
1046  002746  010067  175034                        MOV     R0,RTRAP5+2             ;SET UP NEW PSW IN VECTOR
1047  002752  005067  175020                        CLR     STATUS          ;CLEAR PRESENT (OLD) STATUS
1048  002756  004000                                JSR     %0,%0                   ;DO TRAP
1049  002760                                  8$:
1050  002760  000642                                BR      ERROR2          ;INSTRUCTION FAILED TO TRAP
1051  002762  020067  175010                1$:     CMP     R0,STATUS       ;IS NEW STATUS CORRECT
1052  002766  001237                                BNE     ERROR2          ;NEW STATUS WRONG
1053  002770  020627  000774                2$:     CMP     SP,#STBOT-4     ;DID STACK DECREMENT CORRECTLY
1054  002774  001234                                BNE     ERROR2          ;STACK DID NOT DECREMENT CORRECTLY
1055  002776  022767  002760  175770        3$:     CMP     #8$,STBOT-4     ;WAS PROPER PC SAVED
1056  003004  001230                                BNE     ERROR2          ;PROPER PC WAS NOT SAVED
1057  003006  005767  175764                4$:     TST     STBOT-2         ;WAS OLD PSW SAVED
 058  003012  001225                                BNE     ERROR2          ;WRONG PSW SAVED
1059  003014  062706  000004                5$:     ADD     #4,SP           ;RESET STACK POINTER
1060  003020  012767  003042  174756                MOV     #6$,RTRAP5              ;SET UP NEW PC IN VECTOR
1061  003026  005067  174754                        CLR     RTRAP5+2                ;SET UP NEW PSW IN VECTOR
1062  003032  010037  177776                        MOV     R0,@#STATUS     ;SET UP OLD STATUS FOR COMPARISON AFTER TRAP
1063  003036  004000                                JSR     %0,%0                   ;DO TRAP
1064  003040  000612                                BR      ERROR2          ;INSTRUCTION FAILED TO TRAP
1065  003042  005767  174730                6$:     TST     STATUS          ;IS NEW PSW CORRECT
1066  003046  001207                                BNE     ERROR2          ;NEW PSW WRONG
1067  003050  020067  175722                7$:     CMP     R0,STBOT-2      ;WAS OLD STATUS STORED
1068  003054  001204                                BNE     ERROR2          ;OLD STATUS WRONG
1069
1070                                          ;*****************************************************************************
1071                                          .SBTTL  DATA PATH TESTS
1072                                          ;
1073                                          ;       THE DATA PATH TESTS ARE USED TO VERIFY THAT VARIOUS
1074                                          ;DATA PATTERNS CAN BE SUCCESSFULLY MOVED THROUGH THE DATA PATHS
1075                                          ;MOVE AND COMPARE MODE 2,3 INSTRUCTIONS ARE USED TO PASS AND
1076                                          ;TEST VARIOUS DATA PATTERNS IN THE DATA PATHS.
1077                                          ;       THE TEST EXERCISES THE INTERNAL DATA PATHS,  AND THE UNIBUS
1078                                          ;DATA TRANSCIEVERS.
1079                                          ;       IF THESE TESTS FAIL, EXAMINE THE TARGET LOCATION (LOC. 0)
1080                                          ;TO SEE WHICH BITS OF THE DATA PATH ARE FAILING.
1081  003056  012737  002130  000030                MOV     #ERROR1,@#30    ;SET UP VECTOR FOR ERROR CALLS
1082  003064  012737  000340  000032                MOV     #340,@#32       ;SET UP NEW PSW
1083  003072  012737  021336  000004                MOV     #T04,@#4        ;SET UP FOR UNEXPECTED TRAP TO 4
1084  003100  012737  021340  000010                MOV     #T010,@#10      ;SET UP FOR UNEXPECTED TRAP TO 10
1085  003106  012737  021342  000014                MOV     #T014,@#14      ;SET UP FOR UNEXPECTED TRAP TO 14
1086  003114  012737  021350  000034                MOV     #T034,@#34      ;SET UP FOR UNEXPECTED TRAP TO 34
1087
1088
1089                                          ;*****************************************************************************
1090                                          ;TEST 11        TEST OF ZEROES IN THE DATA PATH
1091                                          ;*****************************************************************************
1092  003122                                  TS11:
1093  003122  012737  000000  000000                MOV     #0,@#0          ;MOVE ZEROES THRU ADDRESS LINES, DATA
1094                                                                          ;LINES AND INTERNAL PATHS
```

```
1095  003130  005737  000000          TST     @#0             ;SUCCESSFUL?
1096  003134  001401                  BEQ     TS12
1097  003136  104000                  EMT                     ;DATA INCORRECT
1098
1099                                  ;*************************************************************************************
1100                                  ;TEST 12        TEST OF PATTERN 125252 IN DATA PATH
1101                                  ;*************************************************************************************
1102  003140                          TS12:
1103  003140  012737  125252  000000          MOV     #125252,@#0     ;MOVE ALTERNATING ONES AND ZEROES
1104                                                                  ;THRU DATA PATHS
1105  003146  022737  125252  000000          CMP     #125252,@#0     ;SUCCESSFUL
1106  003154  001401                          BEQ     TS13
1107  003156  104000                          EMT                     ;DATA INCORRECT
1108
1109                                  ;*************************************************************************************
1110                                  ;TEST 13        TEST OF PATTERN 052525 IN DATA PATH
1111                                  ;*************************************************************************************
1112  003160                          TS13:
1113  003160  012737  052525  000000          MOV     #052525,@#0     ;MOVE ALTERNATING ZEROES AND ONES
1114                                                                  ;THRU DATA PATH
1115  003166  022737  052525  000000          CMP     #052525,@#0     ;SUCCESSFUL?
1116  003174  001401                          BEQ     TS14
1117  003176  104000                          EMT                     ;DATA INCORRECT
1118
1119                                  ;*************************************************************************************
1120                                  ;TEST 14        TEST OF ALL ONES IN DATA PATH
1121                                  ;*************************************************************************************
1122  003200                          TS14:
1123  003200  012737  177777  000000          MOV     #177777,@#0     ;MOVE ONES THRU DATA PATH
1124  003206  022737  177777  000000          CMP     #177777,@#0     ;SUCCESSFUL
1125  003214  001401                          BEQ     TS15
1126  003216  104000                          EMT                     ;DATA INCORRECT
1127
1128                                  ;*************************************************************************************
1129                                  .SBTTL  B-REGISTER TEST
1130                                  ;
1131                                  ;       THE B-REGISTER (LOCATION 0) SHIFTING LOGIC TESTS ARE USED
1132                                  ;TO TEST THAT THE B-REGISTER CAN HOLD VARIOUS DATA PATTERNS AND THAT
1133                                  ;THE ASSOCIATED LOGIC SUPPORTS THE SHIFTING FUNCTIONS WITHIN THE
1134                                  ;B-REGISTER AND C-BIT.
1135                                  ;A ONE IS SHIFTED THROUGH EVERY BIT IN THE B-REGISTER AND C-BIT IN
1136                                  ;BOTH DIRECTIONS.
1137                                  ;       THE B-REGISTER ITSELF IS TESTED IN ITS ABILITY AS A BUFFER AND AS
1138                                  ;A SHIFT REGISTER.  DATA IS ALSO PASSED THROUGH THE DATA PATH AND ALU,
1139                                  ;       IF THESE TESTS FAIL, EXAMINE THE TARGET LOCATION (LOC. 0) TO SEE
1140                                  ;WHICH BITS OF THE B-REGISTER MAY BE FAILING.
1141                                  ;
1142                                  ;*************************************************************************************
1143                                  ;TEST 15        SHIFT BIT 0 TO BIT 1
1144                                  ;*************************************************************************************
1145  003220                          TS15:
1146  003220  000241                          CLC                     ;CLEAR CARRY BIT
1147  003222  012737  000001  000000          MOV     #1,@#0          ;LOAD A 1
1148  003230  006137  000000                  ROL     @#0             ;SHIFT LEFT
1149  003234  022737  000002  000000          CMP     #2,@#0          ;SUCCESSFUL
1150  003242  001401                          BEQ     TS16
```

```
1151  003244  104000                          EMT                     ;BIT 1 NOT SET
1152
1153                                          ;*************************************************************************
1154                                          ;TEST 16        SHIFT CARRY INTO BIT 0
1155                                          ;*************************************************************************
1156  003246                                  TS16:
1157  003246  012737  000000  000000          MOV     #0,@#0          ;CLEAR LOCATION
1158  003254  000261                          SEC                     ;SET CARRY
1159  003256  006137  000000                  ROL     @#0             ;ROTATE CARRY BIT TO BIT 0
1160  003262  103001                          BCC     CARRY1
1161  003264  104000                          EMT                     ;CARRY CLEAR
1162  003266  022737  000001  000000  CARRY1: CMP     #1,@#0          ;BIT 0 SET
1163  003274  001401                          BEQ     TS17
1164  003276  104000                          EMT                     ;BIT 0 NOT SET
1165
1166                                          ;*************************************************************************
1167                                          ;TEST 17        LEFT SHIFT FROM BIT 0 TO C-BIT
1168                                          ;*************************************************************************
1169  003300                                  TS17:
1170  003300  012737  000001  000000          MOV     #1,@#0          ;SET BIT 0
1171  003306  012700  177757                  MOV     #-21,R0         ;SET BIT COUNTER
1172  003312  000241                          CLC                     ;CLEAR C-BIT
1173  003314  005200                  SHL:    INC     R0              ;INCREMENT BIT COUNTER
1174  003316  001404                          BEQ     SHLE            ;BR TO ERROR HALT IF BIT IS LOST
1175  003320  006137  000000                  ROL     @#0             ;SHIFT LEFT ONE POSITION
1176  003324  103373                          BCC     SHL             ;BRANCH IF C-BIT NOT SET
1177  003326  001401                          BEQ     TS20
1178  003330                                  SHLE:
1179  003330  104000                          EMT                     ;LEFT SHIFTING LOGIC FAILED
1180
1181                                          ;*************************************************************************
1182                                          ;TEST 20        SHIFT BIT 15 TO BIT 14
1183                                          ;*************************************************************************
1184  003332                                  TS20:
1185  003332  012737  100000  000000          MOV     #100000,@#0     ;SET BIT 15
1186  003340  000241                          CLC                     ;CLEAR CARRY
1187  003342  006037  000000                  ROR     @#0             ;SHIFT BIT 15 TO BIT 14
1188  003346  022737  040000  000000          CMP     #40000,@#0      ;SUCCESSFUL
1189  003354  001401                          BEQ     TS21
1190  003356  104000                          EMT                     ;BIT 14 NOT SET
1191
1192                                          ;*************************************************************************
1193                                          ;TEST 21        RIGHT SHIFT FROM BIT 15 TO C-BIT
1194                                          ;*************************************************************************
1195  003360                                  TS21:
1196  003360  012737  100000  000000          MOV     #100000,@#0     ;SET BIT 15
1197  003366  012700  177757                  MOV     #-21,R0         ;SET BIT COUNTER
1198  003372  000241                          CLC                     ;CLEAR C-BIT
1199  003374  005200                  SHR:    INC     R0              ;INCREMENT BIT COUNTER
1200  003376  001404                          BEQ     SHRE            ;BR TO ERROR HALT IF BIT IS LOST
1201  003400  006037  000000                  ROR     @#0             ;ROTATE RIGHT ONE POSITION
1202  003404  103373                          BCC     SHR             ;BRANCH IF C-BIT CLEAR
1203  003406  001401                          BEQ     TS22
1204  003410                                  SHRE:
1205  003410  104000                          EMT                     ;RIGHT SHIFT LOGIC FAILED
1206
```

```
                                ;*****************************************************************************
                                .SBTTL  SCRATCH PAD TESTS
                                ;
                                ;       THE SCRATCH PAD TESTS ARE USED TO VERIFY THAT VARIOUS
                                ;DATA PATTERNS CAN BE SUCCESSFULLY HELD IN THE SCRATCH PAD
                                ;CIRCUITRY.  MOVE AND COMPARE INSTRUCTIONS ARE USED TO TEST THAT
                                ;R0 CAN HOLD VARIOUS DATA PATTERNS.  EACH DATA PATTERN IS
                                ;MOVED AND TESTED IN A SMALL LOOP CONVENIENT FOR SCOPING.  THE
                                ;SUCCESSFUL COMPLETION OF THESE TESTS SHOULD VERIFY THE CIRCUITRY EXTERNAL
                                ;TO THE SCRATCH PAD ITSELF.
                                ;       THE REMAINDER OF THE GENERAL REGISTERS ARE TESTED BY MOVING
                                ;A BIT INTO BIT 0 OF THE REGISTER AND SHIFTING IT LEFT ONE
                                ;BIT AT A TIME INTO THE CARRY BIT.  THE RESULT IS THEN CHECKED TO INSURE THAT
                                ;NO BITS WERE PICKED. THE PROCEDURE IS THEN REPEATED UNDER OPPOSITE
                                ;CONDITIONS. THE GENERAL REGISTER AND THE CARRY BIT ARE SET TO
                                ;ALL ONES, AND A ZERO IS SHIFTED LEFT FROM BIT 0 INTO THE CARRY BIT.
                                ;THE RESULT IS THEN CHECKED TO INSURE THAT NO ZEROES WERE PICKED.
                                ;       AT THIS POINT ALL OF THE GENERAL REGISTERS HAVE BEEN EXERCISED
                                ;AS WELL AS REGISTER 11.
                                ;
                                ;*****************************************************************************
                                ;TEST 22        TEST IF R0 CAN HOLD ALL ZEROES
                                ;*****************************************************************************
003412                          TS22:

003412  012700  000000                  MOV     #0,R0           ;MOVE ZEROES TO R0
003416  005700                          TST     R0              ;SUCCESSFUL?
003420  001401                          BEQ     TS23
003422  104000                          EMT                     ;R0 NOT 0

                                ;*****************************************************************************
                                ;TEST 23        TEST IF R0 CAN HOLD ONES AND ZEROES
                                ;*****************************************************************************
003424                          TS23:
003424  012700  125252                  MOV     #125252,R0      ;MOVE ALTERNATING ONES AND ZEROES TO R0
003430  020027  125252                  CMP     R0,#125252      ;SUCCESSFUL?
003434  001401                          BEQ     TS24
003436  104000                          EMT                     ;R0 NOT 125252

                                ;*****************************************************************************
                                ;TEST 24        TEST IF R0 CAN HOLD ZEROES AND ONES
                                ;*****************************************************************************
003440                          TS24:
003440  012700  052525                  MOV     #052525,R0      ;MOVE ALTERNATING ZEROES AND ONES TO R0
003444  020027  052525                  CMP     R0,#052525      ;SUCCESSFUL?
003450  001401                          BEQ     TS25
003452  104000                          EMT                     ;R0 NOT 52525

                                ;*****************************************************************************
                                ;TEST 25        TEST IF R0 CAN HOLD ALL ONES
                                ;*****************************************************************************
003454                          TS25:
003454  012700  177777                  MOV     #177777,R0      ;MOVE ALL ONES TO R0
003460  020027  177777                  CMP     R0,#177777      ;SUCCESSFUL?
003464  001401                          BEQ     TS26
003466  104000                          EMT                     ;R0 NOT 177777
```

```
1263
1264
1265
1266
1267  003470
1268  003470  012701  000001          ;*****************************************************************************
1269  003474  012700  177757          ;TEST 26        TEST IF R1 CAN HOLD A ONE IN ALL BITS
1270  003500  000241                  ;*****************************************************************************
1271  003502  005200                  TS26:
1272  003504  001403                          MOV     #1,R1           ;SET BIT 0
1273  003506  006101                          MOV     #-21,R0         ;SET BIT COUNTER
1274  003510  103374                          CLC                     ;CLEAR C-BIT
1275  003512  001401                  REG1:   INC     R0              ;INCREMENT BIT COUNTER
1276  003514                                  BEQ     REG1E           ;BR TO ERROR HALT IF BIT IS LOST
1277  003514  104000                          ROL     R1              ;ROTATE 1 POSITION
1278                                          BCC     REG1            ;ALL DONE
1279                                          BEQ     TS27
1280                                  REG1E:
1281                                          EMT                     ;FAILURE WITH R1
1282  003516
1283  003516  012701  177776          ;*****************************************************************************
1284  003522  012700  177757          ;TEST 27        TEST IF R1 CAN HOLD A ZERO IN ALL BITS
1285  003526  000261                  ;*****************************************************************************
1286  003530  005200                  TS27:
1287  003532  001405                          MOV     #-2,R1          ;SET ALL ONES IN R1 EXCEPT FOR BIT 0
1288  003534  006101                          MOV     #-21,R0         ;SET BIT COUNTER
1289  003536  103774                          SEC                     ;SET C-BIT
1290  003540  012701  177777          REG1A:  INC     R0              ;INCREMENT COUNTER
1291  003544  001401                          BEQ     R1ERR           ;BR TO ERROR HALT IF COUNTER=0
1292  003546                                  ROL     R1              ;ROTATE 1 POSITION
1293  003546  104000                          BCS     REG1A           ;CONTINUE UNTIL C-BIT IS CLEAR
1294                                          CMP     #-1,R1          ;CHECK DATA IN R1
1295                                          BEQ     TS30
1296                                  R1ERR:
1297  003550                                  EMT                     ;FAILURE WITH R1
1298  003550  012702  000001          ;*****************************************************************************
1299  003554  012700  177757          ;TEST 30        TEST IF R2 CAN HOLD A ONE IN ALL BITS
1300  003560  000241                  ;*****************************************************************************
1301  003562  005200                  TS30:
1302  003564  001403                          MOV     #1,R2           ;SET BIT 0
1303  003566  006102                          MOV     #-21,R0         ;SET BIT COUNTER
1304  003570  103374                          CLC                     ;CLEAR C-BIT
1305  003572  001401                  REG2:   INC     R0              ;INCREMENT BIT COUNTER
1306  003574                                  BEQ     REG2E           ;BR TO ERROR HALT IF BIT IS LOST
1307  003574  104000                          ROL     R2              ;ROTATE 1 POSITION
1308                                          BCC     REG2            ;ALL DONE
1309                                          BEQ     TS31
1310                                  REG2E:
1311                                          EMT                     ;FAILURE WITH R2
1312  003576
1313  003576  012702  177776          ;*****************************************************************************
1314  003602  012700  177757          ;TEST 31        TEST IF R2 CAN HOLD A ZERO IN ALL BITS
1315  003606  000261                  ;*****************************************************************************
1316  003610  005200                  TS31:
1317  003612  001405                          MOV     #-2,R2          ;SET ALL ONES IN R2 EXCEPT FOR BIT 0
1318  003614  006102                          MOV     #-21,R0         ;SET BIT COUNTER
                                        REG2B:  SEC                     ;SET C-BIT
                                                INC     R0              ;INCREMENT BIT COUNTER
                                                BEQ     R2ERR           ;BR TO ERROR HALT IF COUNTER=0
                                                ROL     R2              ;ROTATE 1 POSITION
```

```
1319  003616  103774                  BCS     REG2B           ;CONTINUE UNTIL C-BIT IS CLEAR
1320  003620  022702  177777          CMP     #-1,R2          ;CHECK DATA IN R2
1321  003624  001401                  BEQ     TS32
1322  003626                  R2ERR:
1323  003626  104000                  EMT                     ;FAILURE WITH R2
1324
1325                          ;*****************************************************************************
1326                          ;TEST 32        TEST IF R3 CAN HOLD A ONE IN ALL BITS
1327                          ;*****************************************************************************
1328  003630                  TS32:
1329  003630  012703  000001          MOV     #1,R3           ;SET BIT 0
1330  003634  012700  177757          MOV     #-21,R0         ;SET BIT COUNTER
1331  003640  000241                  CLC                     ;CLEAR C-BIT
1332  003642  005200          REG3:   INC     R0              ;INCREMENT BIT COUNTER
1333  003644  001403                  BEQ     REG3E           ;BR TO ERROR HALT IF BIT IS LOST
1334  003646  006103                  ROL     R3              ;ROTATE 1 POSITION
1335  003650  103374                  BCC     REG3            ;ALL DONE
1336  003652  001401                  BEQ     TS33
1337  003654                  REG3E:
1338  003654  104000                  EMT                     ;FAILURE WITH R3
1339
1340                          ;*****************************************************************************
1341                          ;TEST 33        TEST IF R3 CAN HOLD A ZERO IN ALL BITS
1342                          ;*****************************************************************************
1343  003656                  TS33:
1344  003656  012703  177776          MOV     #-2,R3          ;SET ALL ONES IN R3 EXCEPT FOR BIT 0
1345  003662  012700  177757          MOV     #-21,R0         ;SET BIT COUNTER
1346  003666  000261                  SEC                     ;SET C-BIT
1347  003670  005200          REG3A:  INC     R0              ;INCREMENT BIT COUNTER
1348  003672  001405                  BEQ     R3ERR           ;BR TO ERROR HALT IF COUNTER=0
1349  003674  006103                  ROL     R3              ;ROTATE 1 POSITION
1350  003676  103774                  BCS     REG3A           ;CONTINUE UNTIL C-BIT IS CLEAR
1351  003700  022703  177777          CMP     #-1,R3          ;CHECK DATA
1352  003704  001401                  BEQ     TS34
1353  003706                  R3ERR:
1354  003706  104000                  EMT                     ;FAILURE WITH R3
1355
1356                          ;*****************************************************************************
1357                          ;TEST 34        TEST IF R4 CAN HOLD A ONE IN ALL BITS
1358                          ;*****************************************************************************
1359  003710                  TS34:
1360  003710  012704  000001          MOV     #1,R4           ;SET BIT 0
1361  003714  012700  177757          MOV     #-21,R0         ;SET BIT COUNTER
1362  003720  000241                  CLC                     ;CLEAR C-BIT
1363  003722  005200          REG4:   INC     R0              ;INCREMENT BIT COUNTER
1364  003724  001403                  BEQ     REG4E           ;BR TO ERROR HALT IF BIT IS LOST
1365  003726  006104                  ROL     R4              ;ROTATE 1 POSITION
1366  003730  103374                  BCC     REG4            ;ALL DONE
1367  003732  001401                  BEQ     TS35
1368  003734                  REG4E:
1369  003734  104000                  EMT                     ;FAILURE WITH R4
1370
1371                          ;*****************************************************************************
1372                          ;TEST 35        TEST IF R4 CAN HOLD A ZERO IN ALL BITS
1373                          ;*****************************************************************************
1374  003736                  TS35:
```

```
1375  003736  012704  177776          MOV     #-2,R4          ;SET ALL ONES IN R4 EXCEPT FOR BIT 0
1376  003742  012700  177757          MOV     #-21,R0         ;SET BIT COUNTER
1377  003746  000261                  SEC                     ;SET C-BIT
1378  003750  005200          REG4A:  INC     R0              ;INCREMENT BIT COUNTER
1379  003752  001405                  BEQ     R4ERR           ;BR TO ERROR HALT IF COUNTER=0
1380  003754  006104                  ROL     R4              ;ROTATE 1 POSITION
1381  003756  103774                  BCS     REG4A           ;CONTINUE UNTIL C-BIT IS CLEAR
1382  003760  022704  177777          CMP     #-1,R4          ;CHECK DATA
1383  003764  001401                  BEQ     TS36
1384  003766                  R4ERR:
1385  003766  104000                  EMT                     ;FAILURE WITH R4
1386
1387
1388                                  ;*****************************************************************************
1389                                  ;TEST 36        TEST IF R5 CAN HOLD A ONE IN ALL BITS
1390                                  ;*****************************************************************************
1391  003770                  TS36:
1392  003770  012705  000001          MOV     #1,R5           ;SET BIT 0
1393  003774  012700  177757          MOV     #-21,R0         ;SET BIT COUNTER
1394  004000  000241                  CLC                     ;CLEAR C-BIT
1395  004002  005200          REG5:   INC     R0              ;INCREMENT BIT COUNTER
1396  004004  001403                  BEQ     REG5E           ;BR TO ERROR HALT IF BIT IS LOST
1397  004006  006105                  ROL     R5              ;ROTATE 1 POSITION
1398  004010  103374                  BCC     REG5            ;ALL DONE
1399  004012  001401                  BEQ     TS37
1400  004014                  REG5E:
1401  004014  104000                  EMT                     ;FAILURE WITH R5
1402
1403                                  ;*****************************************************************************
1404                                  ;TEST 37        TEST IF R5 CAN HOLD A ZERO IN ALL BITS
1405                                  ;*****************************************************************************
1406  004016                  TS37:
1407  004016  012705  177776          MOV     #-2,R5          ;SET ALL ONES IN R5 EXCEPT FOR BIT 0
1408  004022  012700  177757          MOV     #-21,R0         ;SET BIT COUNTER
1409  004026  000261                  SEC                     ;SET C-BIT
1410  004030  005200          REG5A:  INC     R0              ;INCREMENT BIT COUNTER
1411  004032  001405                  BEQ     R5ERR           ;BR TO ERROR HALT IF COUNTER=0
1412  004034  006105                  ROL     R5              ;ROTATE 1 POSITION
1413  004036  103774                  BCS     REG5A           ;CONTINUE UNTIL C-BIT IS C;EAR
1414  004040  022705  177777          CMP     #-1,R5          ;CHECK DATA
1415  004044  001401                  BEQ     TS40
1416  004046                  R5ERR:
1417  004046  104000                  EMT                     ;FAILURE WITH R5
1418
1419                                  ;*****************************************************************************
1420                                  ;TEST 40        TEST IF R6 CAN HOLD A ONE IN ALL BITS
1421                                  ;*****************************************************************************
1422  004050                  TS40:
1423  004050  012706  000001          MOV     #1,R6           ;SET BIT 0
1424  004054  012700  177757          MOV     #-21,R0         ;SET BIT COUNTER
1425  004060  000241                  CLC                     ;CLEAR C-BIT
1426  004062  005200          REG6:   INC     R0              ;INCREMENT BIT COUNTER
1427  004064  001403                  BEQ     REG6E           ;BR TO ERROR HALT IF BIT IS LOST
1428  004066  006106                  ROL     R6              ;ROTATE 1 POSITION
1429  004070  103374                  BCC     REG6            ;ALL DONE
1430  004072  001401                  BEQ     TS41
```

```
1431  004074
1432  004074  104000                    REG6E:
                                              EMT                     ;FAILURE WITH R6
1433
1434                                  ;*************************************************************************************
1435                                  ;TEST 41        TEST IF R6 CAN HOLD A ZERO IN ALL BITS
1436                                  ;*************************************************************************************
1437  004076
1438  004076  012706  177776          TS41:
                                              MOV     #-2,R6          ;SET ALL ONES IN R6 EXCEPT FOR BIT 0
1439  004102  012700  177757                 MOV     #-21,R0         ;SET BIT COUNTER
1440  004106  000261                         SEC                     ;SET C-BIT
1441  004110  005200                  REG6A: INC     R0               ;INCREMENT BIT COUNT
1442  004112  001405                         BEQ     R6ERR           ;BR TO ERROR HALT IF COUNTER=0
1443  004114  006106                         ROL     R6              ;ROTATE 1 POSITION
1444  004116  103774                         BCS     REG6A           ;CONTINUE UNTIL C-BIT IS CLEAR
1445  004120  022706  177777                 CMP     #-1,R6          ;CHECK DATA
1446  004124  001401                         BEQ     TS42
1447  004126                           R6ERR:
1448  004126  104000                         EMT                     ;FAILURE WITH R6
1449
1450                                  ;*************************************************************************************
1451                                  .SBTTL  PSW TESTS
1452                                  ;
1453                                  ;       THE PSW TESTS ARE USED TO VERIFY THAT VARIOUS DATA
1454                                  ;PATTERNS CAN BE SUCCESSFULLY HELD IN THE PSW AND THAT THE
1455                                  ;PSW ADDRESSING LOGIC IS FUNCTIONING.  MOVE AND COMPARE INSTRUCTIONS
1456                                  ;ARE USED TO TEST THAT THE PSW CAN HOLD VARIOUS DATA PATTERNS.
1457                                  ;EACH DATA PATTERN IS MOVED AND TESTED IN A SMALL LOOP CONVENIENT FOR
1458                                  ;SCOPING.
1459                                  ;       THE PSW REGISTER IS TESTED, THE CC INPUTS ARE TESTED
1460                                  ;LATER IN THE MICROCODE TESTS.  SETTING OF THE T-BIT BY THE
1461                                  ;TEST PATTERNS IS PURPOSELY AVOIDED. TESTING OF THE
1462                                  ;T-BIT TRAP CIRCUITRY IS LEFT FOR THE TRAP TEST.
1463                                  ;
1464                                  ;*************************************************************************************
1465                                  ;TEST 42        TEST IF PSW WILL HOLD ZEROES
1466                                  ;*************************************************************************************
1467  004130
1468  004130  012706  001000          TS42:
                                              MOV     #STBOT,R6
1469  004134  012737  000000  177776         MOV     #0,@#PS         ;SET PSW TO ZERO
1470  004142  005737  177776                 TST     @#PS            ;SUCCESSFUL
1471  004146  001401                         BEQ     TS43
1472  004150  104000                         EMT                     ;PSW NOT 0
1473
1474                                  ;*************************************************************************************
1475                                  ;TEST 43        TEST IF PSW WILL HOLD ONES AND ZEROES
1476                                  ;*************************************************************************************
1477  004152
1478  004152  012737  000252  177776  TS43:
                                              MOV     #252,@#PS       ;MOVE ALT. ONES AND ZEROES TO PSW
1479  004160  023727  177776  000252         CMP     @#PS,#252       ;SUCCESSFUL?
1480  004166  001401                         BEQ     TS44
1481  004170  104000                         EMT                     ;PSW NOT 252
1482
1483                                  ;*************************************************************************************
1484                                  ;TEST 44        TEST IF PSW (EXCEPT T-BIT) WILL HOLD ZEROES AND ONES
1485                                  ;*************************************************************************************
1486  004172                          TS44:
```

```
 1487  004172  012737  000105  177776          MOV     #105,@#PS       ;MOVE ALT. ONES AND ZEROES TO PSW
 1488  004200  023727  177776  000105          CMP     @#PS,#105       ;SUCCESSFUL?
 1489  004206  001401                          BEQ     TS45
 1490  004210  104000                          EMT                     ;PSW NOT 105
 1491
 1492                                  ;*****************************************************************************
 1493                                  ;TEST 45        TEST IF PSW (EXCEPT T-BIT) WILL HOLD ALL ONES
 1494                                  ;*****************************************************************************
 1495  004212                          TS45:
 1496  004212  012737  000357  177776          MOV     #357,@#PS       ;MOVE ONES TO PSW
 1497  004220  023727  177776  000357          CMP     @#PS,#357       ;SUCCESSFUL
 1498  004226  001401                          BEQ     TS46
 1499  004230  104000                          EMT                     ;PSW NOT 357
 1500                                  ;*****************************************************************************
 1501                                  .SBTTL  MICROCODE TESTS
 1502                                  ;
 1503                                  ;       THE TEST EXERCISES  BRANCHES IN THE MICROCODE BY
 1504                                  ;TESTING AT LEAST ONE INSTRUCTION FROM EVERY CLASS OF INSTRUCTION IN
 1505                                  ;ALL POSSIBLE MODES.  FOR EXAMPLE, TO TEST THE SINGLE OPERAND INSTRUCTIONS,
 1506                                  ;AT LEAST ONE SINGLE OPERAND INSTRUCTION IS VERIFIED IN ALL UNIQUE
 1507                                  ;ADDRESSING MODES.  BYTE MODES ARE ALSO TESTED.  AS EACH NEW
 1508                                  ;MODE IS INTRODUCED THE SAME INSTRUCTION IS TRIED AND TESTED IN
 1509                                  ;A SMALL LOOP CONVENIENT FOR SCOPING.  THE TEST IS SET UP USING
 1510                                  ;ONLY INSTRUCTIONS AND ADDRESSING MODES WHICH HAVE BEEN PREVIOUSLY
 1511                                  ;VERIFIED.
 1512                                  ;       IF THESE TESTS FAIL, CHECK THE RESULTS FOR A CLUE TO THE
 1513                                  ;FAULT.
 1514                                  ;
 1515                                  ;*****************************************************************************
 1516
 1517
 1518
 1519                                  ;*****************************************************************************
 1520                                  ;
 1521                                  ;       THE CLR INSTRUCTION IS USED TO INTRODUCE EACH ADDRESSING
 1522                                  ;MODE WITH THE SINGLE OPERAND INSTRUCTION.  FOLLOWING THE SEQUENCE CHECK,
 1523                                  ;THE CLR INSTRUCTION IS EXECUTED AND A BRANCH TEST IS EXECUTED WHICH
 1524                                  ;CHECKS THAT THE Z-BIT WAS PROPERLY SET.  THIS TEST CAN CHECK IR DECODE
 1525                                  ;AND MICROCODE FOR SOP INSTRUCTIONS WITH MODE 0.  FOLLOWING THIS TEST
 1526                                  ;SEVERAL OTHER SOP INSTRUCTIONS ARE INTRODUCED WITH MODE 0.  THESE
 1527                                  ;INSTRUCTIONS MAINPULATE DATA AND SERVE TO CHECK THE DATA RESULTS
 1528                                  ;OF THE SOP INSTRUCTIONS IN THIS TEST.  THE DATA IN THIS TEST IS
 1529                                  ;OPERATED ON BY EACH INSTRUCTION WITHOUT REINITIALIZING.
 1530                                  ;
 1531                                  ;*****************************************************************************
 1532                                  ;TEST 46        TEST MODE 0 USING SOP INST.
 1533                                  ;*****************************************************************************
 1534  004232                          TS46:
 1535  004232  005000                          CLR     R0              ;TRY THE CLEAR INST.
 1536  004234  001401                          BEQ     SOP0A
 1537  004236  104000                          EMT                     ;CLR DID NOT SET Z-BIT
 1538  004240  005200                  SOP0A:  INC     R0              ;TRY THE INCREMENT INST.
 1539  004242  005100                          COM     R0              ;TRY COMPLEMENT
 1540  004244  005200                          INC     R0
 1541  004246  100401                          BMI     SOP0B
 1542  004250  104000                          EMT                     ;NEGATE DID NOT SET N-BIT
```

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1543  004252  005100  SOP0B:  COM     R0              ;TRY COMPLEMENT INST.
1544  004254  001401          BEQ     TS47
1545  004256  104000          EMT                     ;CUMMULATIVE RESULT OF CLR,INC,NEG AND COM INSTS. FAILED
1546
1547
1548                    ;*****************************************************************************************
1549                    ;
1550                    ;       THIS TEST INTRODUCES THE REMAINING SOP INSTRUCIONS AND TESTS
1551                    ;THEM IN MODE 0.  THE PURPOSE IS TO PROVIDE A BASELINE OF
1552                    ;INSTRUCTIONS FOR USE IN THE SUBSEQUENT TESTS.  SINCE THE MICROCODE FOR
1553                    ;THESE INSTRUCTIONS IS IDENTICAL TO THAT ALREADY TESTED, ANY TROUBLE
1554                    ;SHOOTING EFFORTS SHOULD BE AIMED AT THE ACTUAL IR DECODE AND ALU
1555                    ;FUNCTIONING.
1556                    ;
1557                    ;*****************************************************************************************
1558                    ;TEST 47        TEST REMAINDER OF SOP INSTS IN MODE 0
1559                    ;*****************************************************************************************
1560  004260            TS47:
1561  004260  005000          CLR     R0              ;INITIALIZE
1562  004262  005300          DEC     R0              ;TRY DECREMENT INST.
1563  004264  100401          BMI     SOP0C
1564  004266  104000          EMT                     ;N-BIT NOT SET ON DEC
1565  004270  000261  SOP0C:  SEC                     ;INITIALIZE CARRY
1566  004272  005500          ADC     R0              ;TRY ADD CARRY INST
1567  004274  001007          BNE     SOP0D
1568  004276  000261          SEC                     ;INITIALIZE CARRY
1569  004300  005600          SBC     R0              ;TRY SUBTRACT-CARRY INST
1570  004302  100004          BPL     SOP0D
1571  004304  005100          COM     R0
1572  004306  005200          INC     R0
1573  004310  005300          DEC     R0
1574  004312  001401          BEQ     TS50
1575  004314            SOP0D:
1576  004314  104000          EMT                     ; CUMMULATIVE RESULT OF ADC,SBC,COM,INC AND DEC INSTS. F
1577
1578                    ;*****************************************************************************************
1579                    ;
1580                    ;       THIS TEST INTRODUCES THE BYTE CONTROL LOGIC OF THE PROCESSOR.
1581                    ;THE MODE 0 BYTE MICROCODE IS TESTED.  THE METHOD AND SEQUENCE
1582                    ;OF TESTING IS THE SAME AS THAT USED IN THE SOP MODE 0 TESTS.
1583                    ;
1584                    ;*****************************************************************************************
1585                    ;TEST 50        TEST MODE 0 EVEN BYTE USING SOP INST
1586                    ;*****************************************************************************************
1587  004316            TS50:
1588  004316  105000          CLRB    R0              ;TRY CLEARING EVEN BYTE OF REGISTER
1589  004320  001401          BEQ     SOPB0A
1590  004322  104000          EMT                     ;CLRB DID NOT SET Z-BIT
1591  004324  105100  SOPB0A: COMB    R0              ;TRY SETTING EVEN BYTE OF REGISTER
1592  004326  100002          BPL     SOPB0B
1593  004330  105200          INCB    R0              ;TRY INCREMENTING EVEN BYTE OF REGISTER>>
1594  004332  001401          BEQ     TS51
1595  004334            SOPB0B:
1596  004334  104000          EMT                     ;TEST CUMMULATIVE RESULT OF ABOVE BYTE INST.
1597
1598                    ;*****************************************************************************************
```

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1599
1600                                    ;
1601                                    ;       THIS TEST USES THE CLR INSTRUCTION TO INTRODUCE AND TEST
1602                                    ;SINGLE OPERAND MODE 1 INSTRUCTIONS.  AGAIN, THE CLR INSTRUCTION
1603                                    ;IS USED TO INTRODUCE THE MICROCODE AND TO TEST THAT THE PROPER
1604                                    ;CONDITION CODES ARE SET.  OTHER SOP INSTRUCTIONS ARE USED TO MANIPULATE
1605                                    ;COMMON DATA TO VERIFY THAT THE CORRECT DATA IS PRODUCED.
1606                                    ;
1607                                    ;*****************************************************************************
1608                                    ;TEST 51        TEST MODE 1 USING SOP INST.
1609   004336                           ;*****************************************************************************
1610   004336  005000                   TS51:
1611   004340  005010                           CLR     R0              ;INITIALIZE R0
1612   004342  001401                           CLR     (R0)            ;TRY CLEAR INST W/MODE 1
1613   004344  104000                           BEQ     SOP1A
1614   004346  005310                           EMT                     ;CLR DID NOT SET Z-BIT
1615   004350  100003                   SOP1A:  DEC     (R0)            ;TRY DECREMENT INST W/MODE 1
1616   004352  000261                           BPL     SOP1B
1617   004354  005510                           SEC                     ;INITIALIZE CARRY
1618   004356  001401                           ADC     (R0)            ;TRY ADD-CARRY W/MODE 1
1619   004360                                   BEQ     TS52
1620   004360  104000                   SOP1B:
1621                                            EMT                     ;TEST CUMMULATIVE RESULT OF ABOVE INST
1622                                    ;*****************************************************************************
1623                                    ;
1624                                    ;       THIS TEST VERIFIES THE BYTE INSTRUCTION MICROCODE FOR MODE 1
1625                                    ;SINGLE OPERAND INSTRUCTIONS.
1626                                    ;       THIS IS THE FIRST PLACE THE SIGN EXTEND LOGIC IS EXERCISED
1627                                    ;AND VERIFIED.
1628                                    ;
1629                                    ;*****************************************************************************
1630                                    ;TEST 52        TEST MODE 1 EVEN BYTE USING SOP INST
1631                                    ;*****************************************************************************
1632   004362                           TS52:
1633   004362  005000                           CLR     R0              ;INITIALIZE R0
1634   004364  005010                           CLR     (R0)            ;INITIALIZE LOC. 0
1635   004366  005110                           COM     (R0)
1636   004370  105010                           CLRB    (R0)            ;TRY TO CLEAR BYTE 0
1637   004372  001401                           BEQ     SOPB1A
1638   004374  104000                           EMT                     ;CLRB DID NOT SET Z-BIT
1639   004376  005210                   SOPB1A: INC     (R0)            ;INCREMENT TO TEST WORD
1640   004400  100005                           BPL     SOPB1B
1641   004402  105110                           COMB    (R0)            ;COMPLEMENT:  ODD BYTE = 376
1642   004404  105210                           INCB    (R0)            ;INC:  ODD BYTE = 377
1643   004406  100002                           BPL     SOPB1B
1644   004410  105210                           INCB    (R0)            ;INCREMENT ODD BYTE=0
1645   004412  001401                           BEQ     TS53
1646   004414                           SOPB1B:
1647   004414  104000                           EMT                     ;CHECK CUMMULATIVE RESULT OF ABOVE INST
1648
1649
1650                                    ;*****************************************************************************
1651                                    ;
1652                                    ;       THIS TEST VERIFIES THAT SINGLE OPERAND BYTE INSTRUCTIONS WILL
1653                                    ;FUNCTION CORRECTLY FOR ODD BYTES.
1654                                    ;       THIS IS THE FIRST TIME THAT ADDRESS LINE 0 HAS BEEN
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1655
1656
1657
1658
1659
1660
1661
1662  004416
1663  004416  005000          ;EXERCISED.  CHECKS ARE MADE THAT THE PROPER BYTE IS MODIFIED AND
1664  004420  005010          ;THE CONDITION CODES ARE CHECKED.  IT IS ALSO VERIFIED THAT THE UNADDRESSED
1665  004422  005110          ;BYTE IS NOT ALTERED BY THE INSTRUCTION.
1666  004424  005200          ;
1667  004426  105010          ;*****************************************************************************
1668  004430  001401          ;TEST 53        TEST MODE 1 ODD BYTE USING SOP INST
1669  004432  104000          ;*****************************************************************************
1670  004434  005300          TS53:
1671  004436  005210                  CLR     R0              ;INITIALIZE R0
1672  004440  005200                  CLR     (R0)            ;INITIALIZE LOC. 0
1673  004442  105110                  COM     (R0)
1674  004444  105210                  INC     R0              ;R0=ODD BYTE
1675  004446  100002                  CLRB    (R0)            ;TRY TO CLEAR BYTE 1
1676  004450  105210                  BEQ     SOPB1C
1677  004452  001401                  EMT                     ;CLRB DID NOT SET Z-BIT
1678  004454          SOPB1C: DEC     R0              ;R0=WORD ADDR.
1679  004454  104000                  INC     (R0)            ;INCREMENT TO TEST WORD
1680                          INC     R0              ;R0=ODD BYTE
1681                          COMB    (R0)            ;TRY TO COMPLEMENT BYTE 1
1682                          INCB    (R0)
1683                          BPL     SOPB1D
1684                          INCB    (R0)            ;TRY TO INCREMENT BYTE 1
1685                          BEQ     TS54
1686                  SOPB1D:
1687                          EMT                     ;TEST CUMMULATIVE RESULT OF ABOVE INST.
1688
1689                  ;*****************************************************************************
1690                  ;
1691                  ;       THIS TEST VERIFIES MODE 2 SINGLE-OPERAND INSTRUCTIONS.  PREVIOUSLY
1692                  ;TESTED INSTRUCTIONS ARE USED TO SET A POINTER IN R0 TO LOC. 400.
1693                  ;LOC. 400 IS INITIALIZED TO -1 BEFORE A CLR MODE 2 IS EXECUTED.
1694  004456          ;       THEN R0 IS DECREMENTED BY TWO TO AGAIN POINT TO 400 BEFORE EACH
1695  004456  005000  ;OF SEVERAL MODE 2 INSTRUCTIONS ARE USED TO VERIFY THE DATA RESULTS OF
1696  004460  105100  ;THE TEST.  THIS PROCEDURE ALSO VERIFIES THE PROPER INCREMENTING OF THE
1697  004462  005200  ;REGISTER.
1698  004464  005010  ;
1699  004466  005110  ;*****************************************************************************
1700  004470  005020  ;TEST 54        TEST MODE 2 USING SOP INST.
1701  004472  001401  ;*****************************************************************************
1702  004474  104000  TS54:
1703  004476  005300          CLR     R0              ;SET R0=400
1704  004500  005300          COMB    R0
1705  004502  005120          INC     R0
1706  004504  100004          CLR     (R0)            ;CLEAR 400
1707  004506  005300          COM     (R0)            ;INITIALIZE: 400=-1
1708  004510  005300          CLR     (R0)+           ;TRY CLEARING WITH MODE 2
1709  004512  005220          BEQ     SOPZA
1710  004514  001401          EMT                     ;CLR INST DID NOT SET Z-BIT
                        SOPZA:  DEC     R0              ;RESET R0
                                DEC     R0
                                COM     (R0)+           ;TRY COMPLEMENTING WITH MODE 2
                                BPL     SOP2B
                                DEC     R0              ;RESET R0
                                DEC     R0
                                INC     (R0)+           ;TRY INCREMENTING WITH MODE 2
                                BEQ     TS55
```

```
1711  004516
1712  004516  104000          SOP2B:
                                      EMT                       ;CHECK CUMMULATIVE RESULT OF ABOVE INST
1713
1714                          ;*********************************************************************************
1715                          ;
1716                          ;       THIS TEST VERIFIES MODE 2 SINGLE OPERAND INSTRUCTIONS WHICH
1717                          ;ADDRESS EVEN BYTES.  R0 IS SET TO 400 AND USED TO INITIALIZE LOCATION
1718                          ;400 TO -1.  CLRB INSTRUCTION IS THEN EXECUTED ON BYTE 400 WITH
1719                          ;MODE 2.
1720                          ;       R0 IS THEN DECREMENTED BEFORE EACH OF SEVERAL MODE 2 INSTRUCTIONS
1721                          ;WHICH ARE USED TO VERIFY THE DATA RESULTS OF THE TEST.  THIS PROCEDURE ALSO
1722                          ;VERIFIES THE PROPER INCREMENTING OF THE REGISTER.
1723                          ;
1724                          ;*********************************************************************************
1725                          ;TEST 55        TEST MODE 2 EVEN BYTE USING SOP INST.
1726                          ;*********************************************************************************
1727  004520                  TS55:
1728  004520  005000                 CLR     R0                  ;SET R0=400
1729  004522  105100                 COMB    R0
1730  004524  005200                 INC     R0
1731  004526  005010                 CLR     (R0)                ;CLEAR 400
1732  004530  005110                 COM     (R0)                ;INITIALIZE: 400=-1
1733  004532  105020                 CLRB    (R0)+               ;TRY TO CLEAT 400 W/MODE 2
1734  004534  001401                 BEQ     SOPB2A
1735  004536  104000                 EMT                         ;CLR DID NOT SET Z-BIT
1736  004540  005300          SOPB2A: DEC     R0                  ;RESULT R0=400
1737  004542  005210                 INC     (R0)                ;INC 400 TO TEST WORD
1738  004544  105110                 COMB    (R0)
1739  004546  105220                 INCB    (R0)+               ;TRY TO INC EVEN BYTE
1740  004550  100003                 BPL     SOPB2B
1741  004552  005300                 DEC     R0                  ;RESET R0=400
1742  004554  105220                 INCB    (R0)+               ;TRY INCREMENT OF EVEN BYTE
1743  004556  001401                 BEQ     TS56
1744  004560                  SOPB2B:
1745  004560  104000                 EMT                         ;TEST CUMMULATIVE RESULT OF ABOVE INST.
1746
1747                          ;*********************************************************************************
1748                          ;
1749                          ;       THIS TEST FOLLOWS THE SAME PROCEDURE DESCRIBED IN THE PREVIOUS
1750                          ;TEST.  HERE, THE BYTE INSTRUCTION IS USED TO ADDRESS AN ODD BYTE.
1751                          ;
1752                          ;*********************************************************************************
1753                          ;TEST 56        TEST MODE 2 ODD BYTE USING SOP INST.
1754                          ;*********************************************************************************
1755  004562                  TS56:
1756  004562  005000                 CLR     R0                  ;SET R0=400
1757  004564  105100                 COMB    R0
1758  004566  005200                 INC     R0
1759  004570  005010                 CLR     (R0)                ;CLEAR LOC 400
1760  004572  005110                 COM     (R0)                ;INITIALIZE: 400=-1
1761  004574  005200                 INC     R0                  ;R0=ODD BYTE
1762  004576  105020                 CLRB    (R0)+               ;TRY TO CLEAR ODD BYTE
1763  004600  001401                 BEQ     SOPB2C
1764  004602  104000                 EMT                         ;CLRB DID NOT SET Z-BIT
1765  004604  005300          SOPB2C: DEC     R0                  ;R0=WORD ADDR.
1766  004606  005300                 DEC     R0
```

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 1767  004610  005220          INC     (R0)+           ;INCREMENT WORD
 1768  004612  005300          DEC     R0              ;POINT TO ODD BYTE
 1769  004614  105110          COMB    (R0)            ;COMPLEMENT ODD BYTE
 1770  004616  105220          INCB    (R0)+           ;TRY TO INCREMENT ODD BYTE
 1771  004620  100003          BPL     SOPB2D
 1772  004622  005300          DEC     R0              ;RESET R0 TO ODD BYTE
 1773  004624  105220          INCB    (R0)+           ;TRY TO INCREMENT ODD BYTE
 1774  004626  001401          BEQ     TS57
 1775  004630                  SOPB2D:
 1776  004630  104000          EMT                     ;TEST CUMMULATIVE RESULT OF ABOVE INST.
 1777
 1778                          ;*****************************************************************************
 1779                          ;
 1780                          ;       THESE TESTS CHECK THE NEGATE INSTRUCTION IN ALL MODES.  PREVIOUSLY
 1781                          ;TESTED SINGLE-OPERAND INSTRUCTIONS ARE USED TO TEST THE NEGATE INSTRUCTION.
 1782                          ;
 1783                          ;*****************************************************************************
 1784                          ;TEST 57        TEST MODE 0 USING NEGATE INSTRUCTION
 1785                          ;*****************************************************************************
 1786  004632                  TS57:
 1787  004632  005000          CLR     R0              ;SET R0=0
 1788  004634  005200          INC     R0              ;    R0=1
 1789  004636  005400          NEG     R0              ;TRY NEGATE MODE 0:  R0=-1
 1790  004640  100003          BPL     NEG00           ;CC=1001?
 1791  004642  001402          BEQ     NEG00
 1792  004644  102401          BVS     NEG00
 1793  004646  103401          BCS     NEG01
 1794  004650                  NEG00:
 1795  004650  104000          EMT                     ;NEGATE DID NOT SET CC'S CORRECTLY
 1796
 1797  004652  005200  NEG01:  INC     R0              ;TEST DATA RESULT
 1798  004654  001401          BEQ     NEG02
 1799  004656  104000          EMT                     ;DATA RESULT OF NEGATE INCORRECT
 1800
 1801  004660  105100  NEG02:  COMB    R0              ;R0=377
 1802  004662  105400          NEGB    R0              ;R0=1
 1803  004664  100403          BMI     NEG03           ;CC=0001?
 1804  004666  001402          BEQ     NEG03
 1805  004670  102401          BVS     NEG03
 1806  004672  103401          BCS     NEG04
 1807  004674                  NEG03:
 1808  004674  104000          EMT                     ;NEGB DID NOT SET CC'S CORRECTLY
 1809  004676  005300  NEG04:  DEC     R0              ;TEST DATA RESULT
 1810  004700  001401          BEQ     TS60
 1811  004702  104000          EMT                     ;DATA RESULT OF NEGB INCORRECT
 1812                          ;*****************************************************************************
 1813                          ;TEST 60        TEST MODE 1 USING NEGATE INST.
 1814                          ;*****************************************************************************
 1815  004704                  TS60:
 1816  004704  005000          CLR     R0              ;POINT TO LOC. 0
 1817  004706  005010          CLR     (R0)            ;CLEAR LOC. 0
 1818  004710  005210          INC     (R0)            ;LOC. 0=1
 1819  004712  005410          NEG     (R0)            ;TRY NEG. LOC. 0=-1
 1820  004714  100003          BPL     NEG10           ;CC=1001
 1821  004716  001402          BEQ     NEG10
 1822  004720  102401          BVS     NEG10
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1823  004722  103401                  BCS     NEG11
1824  004724                  NEG10:
1825  004724  104000                  EMT                     ;NEGATE DID NOT SET CC'S CORRECTLY
1826
1827  004726  005237  000000  NEG11:  INC     @#0             ;TEST DATA RESULT
1828  004732  001401                  BEQ     NEG12
1829  004734  104000                  EMT                     ;DATA RESULT OF NEGATE INCORRECT
1830  004736  105110          NEG12:  COMB    (R0)            ;LOC. 0=377
1831  004740  105410                  NEGB    (R0)            ;TRY NEGB LOC. 0=1
1832  004742  100403                  BMI     NEG13           ;CC=0001?
1833  004744  001402                  BEQ     NEG13
1834  004746  102401                  BVS     NEG13
1835  004750  103401                  BCS     NEG14
1836  004752                  NEG13:
1837  004752  104000                  EMT                     ;NEGB DID NOT SET CC'S CORRECTLY
1838  004754  005337  000000  NEG14:  DEC     @#0             ;TEST DATA RESULT
1839  004760  001401                  BEQ     TS61
1840  004762  104000                  EMT                     ;DATA RESULT OF NEGB INCORRECT
1841                          ;*****************************************************************************
1842                          ;TEST 61        TEST MODE 2 USING NEGATE INSTRUCTION
1843                          ;*****************************************************************************
1844  004764                  TS61:
1845  004764  005000                  CLR     R0              ;POINT TO LOC. 0
1846  004766  005010                  CLR     (R0)            ;CLEAR LOC. 0
1847  004770  005210                  INC     (R0)            ;LOC. 0=1
1848  004772  005420                  NEG     (R0)+           ;TRY NEG.: LOC. 0=-1
1849  004774  100003                  BPL     NEG20           ;CC=1001?
1850  004776  001402                  BEQ     NEG20
1851  005000  102401                  BVS     NEG20
1852  005002  103401                  BCS     NEG21
1853  005004                  NEG20:
1854  005004  104000                  EMT                     ;NEGATE DID NOT SET CC'S CORRECTLY
1855  005006  105300          NEG21:  DECB    R0              ;R0=LOC. 0
1856  005010  105300                  DECB    R0
1857  005012  105420                  NEGB    (R0)+           ;BYTE 0=1   R0=1
1858  005014  105420                  NEGB    (R0)+           ;BYTE 1=1   R0=2
1859  005016  105340                  DECB    -(R0)           ;R0=1  LOC. 0=01
1860  005020  005300                  DEC     R0              ;R0=0
1861  005022  001401                  BEQ     NEG22
1862  005024  104000                  EMT                     ;REGISTER NOT INCREMENTED CORRECTLY
1863  005026  005337  000000  NEG22:  DEC     @#0             ;LOC. 0=0
1864  005032  001401                  BEQ     TS62
1865  005034  104000                  EMT                     ;NEG BYTE INSTRUCTIONS FAILED
1866
1867                          ;*****************************************************************************
1868                          ;
1869                          ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND INSTRUCTIONS.  IT
1870                          ;USES LOCATION 0 AS ITS TARGET DATA.  A TABLE LOCATED AT LOC. 400
1871                          ;THRU 402 IS USED TO SUPPLY THE ADDRESS OF LOCATION 0 TO THE
1872                          ;INSTRUCTIONS UNDER TEST.
1873                          ;       R0 IS SET TO 400, THE START OF THE ADDRESS TABLE, AND A CLR
1874                          ;INSTRUCTION IS EXECUTED WITH MODE 3 TO CLEAR LOC. 0.  THEN R0
1875                          ;IS DECREMENTED BY TWO AND TWO OTHER MODE 3 INSTRUCTIONS OPERATE ON
1876                          ;LOC. 0 TO VERIFY THE DATA RESULTS OF THE TEST.  THE PROPER INCREMENTING
1877                          ;OF THE REGISTER IS ALSO VERIFIED IN THIS MANNER.
1878                          ;       IF A FAILURE IS DETECTED BE SURE TO VERIFY THAT THE TABLE
```

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1879
1880
1881
1882
1883
1884  005036
1885  005036  005000          ;(LOC. 400-402) HAS THE PROPER VALUES (0).
1886  005040  105100          ;
1887  005042  005200          ;*****************************************************************************
1888  005044  005010          ;TEST 62        TEST MODE 3 USING SOP INST.
1889  005046  005030          ;*****************************************************************************
1890  005050  001401          TS62:
1891  005052  104000                  CLR     R0              ;SET R0=400
1892  005054  005300                  COMB    R0
1893  005056  005300                  INC     R0
1894  005060  005130                  CLR     (R0)            ;CLEAR LOC 400
1895  005062  100002                  CLR     @(R0)+          ;TRY TO CLEAR LOC 0 USING MODE 3 ;R0=402
1896  005064  005230                  BEQ     SOP3A
1897  005066  001401                  EMT                     ;CLR DID NOT SET Z-BIT
1898  005070          SOP3A:  DEC     R0              ;RESET R0=400
1899  005070  104000                  DEC     R0
1900                           COM     @(R0)+          ;TRY TO COMPLEMENT LOC 0 OF MODE 3  ;R0=402
1901                           BPL     SOP3B
1902                           INC     @(R0)+          ;TRY TO INCREMENT LOC 0 W/MODE 3  ;R0=404
1903                           BEQ     TS63
1904                   SOP3B:
1905                           EMT                     ;CUMMULATIVE RESULT OF ABOVE INST FAILED
1906
1907                   ;*****************************************************************************
1908                   ;
1909                   ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND BYTE INSTRUCTIONS
1910                   ;WHICH ADDRESS EVEN BYTES.  AGAIN, THE TARGET LOCATION 0 IS USED
1911                   ;AND THE SAME TABLE AT 400 IS EMPLOYED.
1912                   ;       AFTER POINTING R4 TO THE TABLE (400) AND SETTING LOCATION
1913                   ;0 TO -1, A CLRB INSTRUCTION IS USED TO CLEAR BYTE 0.
1914                   ;       SEVERAL OTHER MODE 3 INSTRUCTIONS ARE THEN USED WITH THE TABLE
1915                   ;TO VERIFY THE DATA RESULTS AND THE PROPER INCREMENTING OF THE REGISTER.
1916  005072          ;IF A FAILURE IS DETECTED, BE SURE THAT THE TABLE (LOCATION 400-402) HAS
1917  005072  005004  ;THE PROPER VALUES (0).
1918  005074  105104  ;
1919  005076  005204  ;*****************************************************************************
1920  005100  005000  ;TEST 63        TEST MODE 3 EVEN BYTE USING SOP INST.
1921  005102  005010  ;*****************************************************************************
1922  005104  005110  TS63:
1923  005106  105034          CLR     R4              ;SET R4=400
1924  005110  001401          COMB    R4
1925  005112  104000          INC     R4
1926  005114  005304          CLR     R0              ;INITIALIZE LOC. 0=-1
1927  005116  005304          CLR     (R0)
1928  005120  005234          COM     (R0)            ;LOC. 0=-1
1929  005122  100006          CLRB    @(R4)+          ;TRY TO CLEAR EVEN BYTE ;LOC. 0=177400  R4=402
1930  005124  105434          BEQ     SOPB3A
1931  005126  100004          EMT                     ;CLRB DID NOT SET Z-BIT
1932  005130  005304  SOPB3A: DEC     R4              ;RESET POINTER  R4=400
1933  005132  005304          DEC     R4
1934  005134  105234          INC     @(R4)+          ;TRY INCREMENTING WORD  LOC.0=177401  R4=402
                         SOPB3B
                         NEGB    @(R4)+          ;TRY TO NEGATE EVEN BYTE ;LOC.0=-1 R4=404
                         BPL     SOPB3B
                         DEC     R4              ;R4=402
                         DEC     R4
                         INCB    @(R4)+          ;TRY TO INCREMENT EVEN BYTE ;LOC. 0=17400
```

```
 1935  005136  001401                BEQ     TS64
 1936  005140
 1937  005140  104000        SOPB3B: EMT                     ;CUMMULATIVE RESULT OF ABOVE INST FAILED
 1938
 1939                        ;*******************************************************************************
 1940                        ;
 1941                        ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND BYTE INSTRUCTIONS
 1942                        ;WHICH ADDRESS ODD BYTES.  THE TARGET IS BYTE 1.  A TABLE AT
 1943                        ;LOC. 400-406 IS USED.  R0 SERVES AS THE TABLE POINTER.
 1944                        ;       R0 IS INITIALIZED TO 400.  LOC. 0 IS SET TO -1 USING THE
 1945                        ;FIRST TWO TABLE ENTRIES.  A CLRB MODE 3 IS EXECUTED ON BYTE 1 USING
 1946                        ;TABLE ADDRESS AT 404.  R0 IS DECREMENTED TO 402 AND SEVERAL SOP
 1947                        ;MODE 3 INSTRUCTIONS ARE USED TO VERIFY DATA RESULTS AND PROPER
 1948                        ;REGISTER INCREMENTING.
 1949                        ;       THE TABLE (400-406) SHOULD CONTAIN 0,0,1,1 BEFORE AND
 1950                        ;AFTER THE TEST IS RUN.
 1951                        ;
```

```
 1952
 1953
 1954
 1955  005142
 1956  005142  005000
 1957  005144  105100
 1958  005146  005200
 1959  005150  005030
 1960  005152  005130
 1961  005154  105030
 1962  005156  001401
 1963  005160  104000
 1964  005162  005300
 1965  005164  005300
 1966  005166  005300
 1967  005170  005300
 1968  005172  005230
```

```
;*****************************************************************************************
;TEST 64         TEST MODE 3 ODD BYTE USING SOP INST.
;*****************************************************************************************
TS64:
        CLR     R0              ;SET R0=400
        COMB    R0
        INC     R0
        CLR     @(R0)+          ;INITIALIZE
        COM     @(R0)+          ;LOC 0=-1 R0=404
        CLRB    @(R0)+          ;TRY TO CLEAR ODD BYTE LOC. 0=377 R0=406
        BEQ     SOPB3C
        EMT                     ;CLRB DID NOT SET Z-BIT
SOPB3C: DEC     R0              ;RESET R0=402
        DEC     R0
        DEC     R0              ;POINT TO EVEN BYTE ADDR.
        DEC     R0
        INC     @(R0)+          ;INCREMENT WORD LOC. 0=400 R0=404
```

```
1969  005174  105430                  NEGB    @(R0)+          ;TRY TO NEGATE ODD BYTE LOC. 0=177400 R0=406
1970  005176  100002                  BPL     SOPB3D
1971  005200  105230                  INCB    @(R0)+          ;TRY TO INCREMENT ODD BYTE LOC.0=0 R0=410
1972  005202  001401                  BEQ     TS65
1973  005204                  SOPB3D:
1974  005204  104000                  EMT                     ;CUMMULATIVE RESULT OF ABOVE INSTS FAILED
1975                          ;*****************************************************************************
1976                          ;TEST 65        TEST MODE 3 USING NEGATE INSTRUCTION
1977                          ;*****************************************************************************
1978  005206                  TS65:
1979  005206  005000                  CLR     R0              ;R0=400
1980  005210  105100                  COMB    R0
1981  005212  005200                  INC     R0
1982  005214  005010                  CLR     (R0)            ;LOC. 400=0
1983  005216  005004                  CLR     R4              ;R4=0
1984  005220  005014                  CLR     (R4)            ;LOC. 0=0
1985  005222  005214                  INC     (R4)            ;LOC. 0=1
1986  005224  005430                  NEG     @(R0)+          ;TRY NEGATE   LOC. 0=-1  R0=402
1987  005226  100003                  BPL     NEG30           ;CC=1001?
1988  005230  001402                  BEQ     NEG30
1989  005232  102401                  BVS     NEG30
1990  005234  103401                  BCS     NEG31
1991  005236                  NEG30:
1992  005236  104000                  EMT                     ;NEG DID NOT SET CC'S CORRECTLY
1993  005240  005214          NEG31:  INC     (R4)            ;LOC. 0=0
1994  005242  001401                  BEQ     NEG32
1995  005244  104000                  EMT                     ;DATA RESULT OF NEG INCORRECT
1996  005246  105137  000001  NEG32:  COMB    @#1             ;LOC 0=177400
1997  005252  005237  000000          INC     @#0             ;LOC. 0=177401
1998  005256  105430                  NEGB    @(R0)+          ;TRY NEGB LOC. 0=177777  R0=404
1999  005260  100401                  BMI     NEG33
2000  005262  104000                  EMT                     ;NEGB FAILED WITH EVEN BYTE
2001  005264  105430          NEG33:  NEGB    @(R0)+          ;TRY NEGB  LOC.0=777  R0=406
2002  005266  100001                  BPL     NEG34
2003  005270  104000                  EMT                     ;NEGB FAILED WITH ODD BYTE
2004  005272  105137  000001  NEG34:  COMB    @#1             ;LOC. 0=177377
2005  005276  105237  000001          INCB    @#1             ;LOC. 0=177777
2006  005302  005214                  INC     (R4)            ;LOC. 0=0
2007  005304  001401                  BEQ     TS66
2008  005306  104000                  EMT                     ;DATA RESULT OF NEGB'S INCORRECT
2009
2010                          ;*****************************************************************************
2011                          ;
2012                          ;       THIS TEST VERIFIES MODE 4 SINGLE OPERAND INSTRUCTIONS.
2013                          ;R0 IS SET TO 400. A CLR INSTRUCTION IS EXECUTED IN MODE 4 TO CLEAR
2014                          ;LOC. 376. R0 IS RESET TO 400 AND A COM INSTRUCTION USING MODE 4
2015                          ;COMPLEMENTS LOC.376.
2016                          ;       TWO INC INSTRUCTIONS AND A MODE 4 INSTRUCTION ARE EXECUTED
2017                          ;TO COMPLETE THE TEST.
2018                          ;*****************************************************************************
2019                          ;TEST 66        TEST MODE 4 USING SOP INSTS
2020                          ;*****************************************************************************
2021  005310                  TS66:
2022  005310  005000                  CLR     R0              ;SET R0=400
2023  005312  105100                  COMB    R0
2024  005314  005200                  INC     R0
```

```
2025  005316  005040                  CLR     -(R0)           ;TRY TO CLEAR USING MODE 4
2026  005320  001401                  BEQ     SOP4A
2027  005322  104000                  EMT                     ;CLR DID NOT SET Z-BIT
2028  005324  005200          SOP4A:  INC     R0              ;RESET R0
2029  005326  005200                  INC     R0
2030  005330  005140                  COM     -(R0)           ;TRY TO COMPLEMENT USING MODE 4
2031  005332  100004                  BPL     SOP4B
2032  005334  005200                  INC     R0              ;MOVE POINTER
2033  005336  005200                  INC     R0
2034  005340  005240                  INC     -(R0)
2035  005342  001401                  BEQ     TS67
2036  005344                  SOP4B:
2037  005344  104000                  EMT                     ;CHECK CUMMULATIVE RESULT OF ABOVE INST.
2038
2039                          ;*****************************************************************************
2040                          ;
2041                          ;       THIS TEST VERIFIES MODE 5 SINGLE OPERAND INSTRUCTIONS.  IT
2042                          ;USES LOCATION 0 AS ITS TARGET DATA.  A TABLE LOCATED AT LOC. 372
2043                          ;THRU 374 IS USED TO SUPPLY THE ADDRESS OF LOCATION 0 TO THE
2044                          ;INSTRUCTIONS UNDER TEST.
2045                          ;       R0 IS SET TO 376, (THE START OF THE ADDRESS TABLE) +2,
2046                          ;AND A CLR INSTRUCTION IS EXECUTED WITH MODE 3 TO CLEAR
2047                          ;LOC. 0.  THEN R0 IS INCREMENTED BY TWO AND TWO OTHER MODE 3
2048                          ;INSTRUCTIONS OPERATE ON LOC. 0 TO VERIFY THE DATA RESULTS OF
2049                          ;THE TEST.  THE PROPER DECREMENTING OF THE REGISTER IS ALSO
2050                          ;VERIFIED IN THIS MANNER.
2051                          ;       IF A FAILURE IS DETECTED BE SURE TO VERIFY THAT THE TABLE
2052                          ;(LOC. 372 THRU 374) HAS THE PROPER VALUES (0).
2053                          ;
2054                          ;*****************************************************************************
2055                          ;TEST 67        TEST MODE 5 USING SOP INSTS
2056                          ;*****************************************************************************
2057  005346                  TS67:
2058  005346  012700  000370                 MOV     #370,R0         ;CLEAR LOCATION 370-376
2059  005352  005020                  CLR     (R0)+           ;370
2060  005354  005020                  CLR     (R0)+           ;372
2061  005356  005020                  CLR     (R0)+           ;374
2062  005360  005010                  CLR     (R0)            ;376
2063  005362  005000                  CLR     R0              ;SET R0=376 (LOW BYTE)
2064  005364  005020                  CLR     (R0)+
2065  005366  105400                  NEGB    R0
2066  005370  005050                  CLR     @-(R0)          ;TRY TO CLEAR LOC 0 W/MODE 5
2067  005372  001401                  BEQ     SOP5A
2068  005374  104000                  EMT                     ;CLR DID NOT SET Z-BIT
2069  005376  005200          SOP5A:  INC     R0              ;RESET R0
2070  005400  005200                  INC     R0
2071  005402  005150                  COM     @-(R0)          ;TRY TO COMPLEMENT LOC. 0 W/MODE 5
2072  005404  100002                  BPL     SOP5B
2073  005406  005250                  INC     @-(R0)          ;TRY TO INCREMENT LOC. 0 W/MODE 5
2074  005410  001401                  BEQ     TS70
2075  005412                  SOP5B:
2076  005412  104000                  EMT                     ;TEST CUMMULATIVE RESULT OF ABOVE INSTS
2077
2078                          ;*****************************************************************************
2079                          ;
2080                          ;       THIS TEST VERIFIES MODE 6 SINGLE OPERAND INSTRUCTIONS.  IT
```

```
                                ;USES LOCATION 0 AS ITS TARGET DATA.  R0 IS SET TO 400 USING
                                ;PREVIOUSLY TESTED INSTRUCTIONS AND A MODE 6 CLR INSTRUCTION IS
                                ;EXECUTED ON LOC. 0 USING R0 AND A -400 OFFSET.  COM AND INC
                                ;INSTRUCTIONS ARE THEN USED TO VERIFY THE DATA.
                                ;
                                ;*********************************************************************************
                                ;TEST 70         TEST MODE 6 USING SOP INSTS
                                ;*********************************************************************************
005414                          TS70:
005414  005000                          CLR     R0              ;SET R0=400
005416  105100                          COMB    R0
005420  005200                          INC     R0
005422  005060  177400                  CLR     -400(R0)        ;TRY TO CLEAR LOCATION 0 W/MODE 6
005426  001401                          BEQ     SOP6A
005430  104000                          EMT                     ;CLR DID NOT SET Z-BIT
005432  005160  177400          SOP6A:  COM     -400(R0)        ;TRY TO COMPLEMENT LOCATION 0 W/MODE 6
005436  100003                          BPL     SOP6B
005440  005260  177400                  INC     -400(R0)        ;TRY TO INCREMENT LOCATION 0 W/MODE 6
005444  001401                          BEQ     TS71
005446                          SOP6B:
005446  104000                          EMT                     ;TEST CUMMULATIVE RESULT OF ABOVE INSTS

                                ;*********************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 7 SINGLE OPERAND INSTRUCTIONS.  IT USES
                                ;THE POINTER TO LOC. 0 WHICH IS STORED AT LOC. 402.
                                ;       R0 IS SET TO 400 AND A MODE 7 CLR INSTRUCTION IS
                                ;EXECUTED WITH A +2 OFFSET TO CLEAR LOC. 0.
                                ;       SEVERAL OTHER MODE 7 INSTRUCTIONS ARE THEN USED ON THE COMMON
                                ;LOCATION TO VERIFY THE DATA RESULTS.
                                ;
                                ;*********************************************************************************
                                ;TEST 71         TEST MODE 7 USING SOP INST.
                                ;*********************************************************************************
005450                          TS71:
005450  005000                          CLR     R0              ;SET R0=400
005452  105100                          COMB    R0
005454  005200                          INC     R0
005456  005210                          INC     (R0)            ;R0=1
005460  005070  000002                  CLR     @2(R0)          ;TRY TO CLEAR LOC. 0 W/MODE 7
005464  001401                          BEQ     SOP7A
005466  104000                          EMT                     ;CLR DID NOT SET Z-BIT
005470  005170  000002          SOP7A:  COM     @2(R0)          ;TRY TO COMPLEMENT LOC. 0 W/MODE 7
005474  100003                          BPL     SOP7B
005476  005270  000002                  INC     @2(R0)          ;TRY TO INCREMENT LOC. 0 W/MODE 7
005502  001401                          BEQ     TS72
005504                          SOP7B:
005504  104000                          EMT                     ;TEST CUMMULATIVE RESULT OF ABOVE INSTS.

                                ;*********************************************************************************
                                ;TEST 72         TEST MODE 4 WITH NEGATE INSTRUCTION
                                ;*********************************************************************************
005506                          TS72:
005506  005000                          CLR     R0
005510  005010                          CLR     (R0)
005512  005120                          COM     (R0)+           ;LOC. 0=177777,  R0=2
```

```
2137  005514  005440                NEG     -(R0)           ;TRY NEGATE, LOC. 0=1
2138  005516  100403                BMI     NEG40           ;CC=0001?
2139  005520  001402                BEQ     NEG40
2140  005522  102401                BVS     NEG40
2141  005524  103401                BCS     NEG41
2142  005526                    NEG40:
2143  005526  104000                EMT                     ;NEG DID NOT SET CC'S CORRECTLY
2144  005530  005400            NEG41:  NEG     R0              ;TST R0 WITH A NEG.
2145  005532  001401                BEQ     NEG42
2146  005534  104000                EMT                     ;R0 NOT DECREMENTED PROPERLY
2147  005536  005310            NEG42:  DEC     (R0)            ;TEST DTA RESULT OF NEG
2148  005540  001401                BEQ     TS73
2149  005542  104000                EMT                     ;DATA RESULT OF NEG INCORRECT
2150                            ;*****************************************************************************
2151                            ;TEST 73        TEST MODE 5 WITH NEGATE INSTRUCTION
2152                            ;*****************************************************************************
2153  005544                    TS73:
2154  005544  005000                CLR     R0              ;R0=0
2155  005546  005010                CLR     (R0)            ;LOC. 0=0
2156  005550  105100                COMB    R0              ;R0=377
2157  005552  005200                INC     R0              ;R0=400
2158  005554  005010                CLR     (R0)            ;SET 400 = 0
2159  005556  005004                CLR     R4              ;R4=0
2160  005560  005314                DEC     (R4)            ;LOC. 0=177777
2161  005562  005450                NEG     @-(R0)          ;TRY NEGATE:  LOC. 0=1
2162  005564  100403                BMI     NEG50           ;CC=0001?
2163  005566  001402                BEQ     NEG50
2164  005570  102401                BVS     NEG50
2165  005572  103401                BCS     NEG51
2166  005574                    NEG50:
2167  005574  104000                EMT                     ;NEG DID NOT SET CC'S CORRECTLY
2168  005576  005314            NEG51:  DEC     (R4)
2169  005600  001401                BEQ     NEG52
2170  005602  104000                EMT                     ;DATA RESULT OF NEG INCORRECT
2171  005604  105100            NEG52:  COMB    R0
2172  005606  005300                DEC     R0
2173  005610  001401                BEQ     TS74
2174  005612  104000                EMT                     ;REGISTER NOT DECREMENTED PROPERLY
2175                            ;*****************************************************************************
2176                            ;TEST 74        TEST MODE 6 WITH NEGATE
2177                            ;*****************************************************************************
2178  005614                    TS74:
2179  005614  005000                CLR     R0              ;R0=0
2180  005616  005004                CLR     R4              ;R4=0
2181  005620  105100                COMB    R0              ;R0=377
2182  005622  005014                CLR     (R4)            ;LOC. 0=0
2183  005624  105024                CLRB    (R4)+           ;LOC. 0=177777,  R4=1
2184  005626  105114                COMB    (R4)            ;LOC. 0=177400
2185  005630  005460  177401        NEG     -377(R0)        ;LOC. 0=400
2186  005634  100403                BMI     NEG60           ;CC=0001
2187  005636  001402                BEQ     NEG60
2188  005640  102401                BVS     NEG60
2189  005642  103401                BCS     NEG61
2190  005644                    NEG60:
2191  005644  104000                EMT                     ;NEG DID NOT SET CC'S CORRECTLY
2192  005646  105314            NEG61:  DECB    (R4)
```

```
2193  005650  001401                    BEQ     TS75
2194  005652  104000                    EMT                     ;DATA RESULT OF NEG INCORRECT
2195                                ;*****************************************************************************
2196                                ;TEST 75        TEST MODE 7 W/ NEGATE
2197                                ;*****************************************************************************
2198  005654                        TS75:
2199  005654  005000                    CLR     R0              ;R0=0
2200  005656  005010                    CLR     (R0)            ;LOC. 0=0
2201  005660  005110                    COM     (R0)            ;LOC. 0=177777
2202  005662  105100                    COMB    R0              ;R0=377
2203  005664  105470  000005           NEGB    @5(R0)          ;R0+5=404,  404=1,  LOC. 0=777
2204  005670  100403                    BMI     NEG70           ;CC=0001?
2205  005672  001402                    BEQ     NEG70
2206  005674  102401                    BVS     NEG70
2207  005676  103401                    BCS     NEG71
2208  005700                        NEG70:
2209  005700  104000                    EMT                     ;NEG DID NOT SET CC'S CORRECTLY
2210  005702  105100                NEG71:  COMB    R0          ;R0=0
2211  005704  105120                    COMB    (R0)+           ;LOC. 0=400,  R0=1
2212  005706  105310                    DECB    (R0)            ;LOC. 0=0
2213  005710  005467  172064           NEG     0               ;USE NEG MODE 67 TO TST FOR ZERO
2214  005714  001401                    BEQ     TS76
2215  005716  104000                    EMT                     ;DATA RESULT OF NEG WAS INCORRECT
2216
2217                                ;*****************************************************************************
2218                                ;
2219                                ;       THIS TEST VERIFIES PROGRAM COUNTER ADDRESSING WITH SOP
2220                                ;INSTRUCTIONS.  CLR MODE 77 IS USED TO CLEAR THE LOCATION FOLLOWING THE
2221                                ;INSTRUCTION (SOPX).  THEN SINGLE OPERAND INSTRUCTIONS WITH MODES 37, 67, AND
2222                                ;77. USING INDIRECT POINTER SOPXAD ARE USED TO VERIFY THE DATA RESULTS
2223                                ;OF THESE INSTRUCTIONS.
2224                                ;
2225                                ;*****************************************************************************
2226                                ;TEST 76        TEST SOP INSTRUCTIONS MODES 2,3,6,7 WITH REGISTER 7
2227                                ;*****************************************************************************
2228  005720                        TS76:
2229  005720  005027                    CLR     (R7)+           ;CLEAR NEXT LOCATION: (SOPX)
2230  005722  177777                SOPX:   -1                  ;USE MODE 27
2231  005724  001401                    BEQ     SOPA
2232  005726  104000                    EMT                     ;CLR DID NOT SET Z-BIT
2233  005730  005237  005722       SOPA:   INC     @#SOPX          ;INC SOPX W/MODE 37
2234  005734  005467  177762           NEG     SOPX            ;NEGATE SOPX W/MODE 67
2235  005740  100003                    BPL     SOPB
2236  005742  005277  000004           INC     @SOPXAD         ;INC SOPX W/MODE 77
2237  005746  001402                    BEQ     TS77
2238  005750                        SOPB:
2239  005750  104000                    EMT                     ;INC DID NOT SET Z-BIT
2240  005752  005722                SOPXAD: SOPX                ;INDIRECT ADDRESS OF SOPX
2241
2242                                ;*****************************************************************************
2243                                ;
2244                                ;       THIS TEST VERIFIES SINGLE OPERAND NON-MODIFYING INSTRUCTIONS
2245                                ;USING MODE 0.  R0 IS SET TO ZERO AND THE CONDITION CODES ARE SET
2246                                ;TO THE COMPLEMENT OF THAT EXPECTED BY THE INSTRUCTION.  A TST INSTRUCTION
2247                                ;IS EXECUTED AND CONDITIONAL BRANCHES ARE USED TO TEST THE CONDITION
2248                                ;CODES.
```

```
2249
2250
2251
2252
2253  005754
2254  005754  005000          ;
2255  005756  000277          ;*****************************************************************************
2256  005760  000244          ;TEST 77        TEST MODE 0 SOP NON-MODIFYING
2257  005762  005700          ;*****************************************************************************
2258  005764  102403          TS77:
2259  005766  100402                  CLR     R0              ;INITIALIZE R0=0
2260  005770  103401                  SCC                     ;SET CC=1011
2261  005772  001401                  CLZ
2262  005774                          TST     R0              ;TRY TST W/ MODE 0
2263  005774  104000                  BVS     SNM0A           ;CHECK T  T CC=0100
2264                                  BMI     SNM0A
2265                                  BCS     SNM0A
2266                                  BEQ     TS100
2267                          SNM0A:
2268                                  EMT                     ;CONDITION CODES NOT SET PROPERLY
2269
2270                          ;*****************************************************************************
2271                          ;
2272                          ;       THIS TEST VERIFIES SINGLE OPERAND NON-MODIFYING BYTE INSTRUCTIONS WITH MODE 0.
2273                          ;R0 IS SET TO 377 AND COMPLEMENT OF THE EXPECTED CONDITION CODES
2274                          ;IS LOADED IN PSW.  A TSTB INSTRUCTION IS EXECUTED AND THE RESULTS
2275                          ;ARE CHECKED WITH SEVERAL CONDITIONAL BRANCH INSTRUCTIONS.
2276  005776                  ;       THIS VERIFIES THAT THE PROPER BYTE WAS TESTED.
2277  005776  005000          ;
2278  006000  105100          ;*****************************************************************************
2279  006002  000277          ;TEST 100       TEST MODE 0 EVEN BYTE W/ SOP NON-MODIFYING
2280  006004  000250          ;*****************************************************************************
2281  006006  105700          TS100:
2282  006010  102402                  CLR     R0              ;INITIALIZE
2283  006012  101401                  COMB    R0              ;R0=377
2284  006014  100401                  SCC                     ;SET CC=0111
2285  006016                          CLN
2286  006016  104000                  TSTB    R0              ;TRY TST EVEN BYTE
2287                                  BVS     SNMB0A          ;CHECK CC=1000
2288                                  BLOS    SNMB0A
2289                                  BMI     TS101
2290                          SNMB0A:
2291                                  EMT                     ;CONDITION CODES NOT SET PROPERLY
2292
2293                          ;*****************************************************************************
2294                          ;
2295                          ;       THIS TEST VERIFIES SINGLE OPERAND INSTRUCTIONS WITH MODE 1.
2296                          ;R0 IS USED TO POINT TO AND CLEAR LOC. 0.  THE COMPLEMENT OF THE
2297                          ;EXPECTED CONDITION CODES ARE LOADED IN THE PSW.  A TST INSTRUCTION
2298                          ;IS THEN EXECUTED ON LOC. 0 USING R0 AND CONDITIONAL BRANCHES TEST
2299  006020                  ;THE RESULTS.
2300  006020  005000          ;
2301  006022  005010          ;*****************************************************************************
2302  006024  000277          ;TEST 101       TEST MODE 1 SOP NON-MODIFYING
2303  006026  000244          ;*****************************************************************************
2304  006030  005710          TS101:
                                 CLR     R0              ;POINT TO LOC 0
                                 CLR     (R0)            ;CLEAR LOC 0
                                 SCC                     ;INITIALIZE
                                 CLZ                     ;CC=1011
                                 TST     (R0)            ;TRY TST W/ MODE 1
```

```
2305  006032  102403                BVS     SNM1A           ;CHECK CC=0100
2306  006034  103402                BCS     SNM1A
2307  006036  100401                BMI     SNM1A
2308  006040  001401                BEQ     TS102
2309  006042                    SNM1A:
2310  006042  104000                EMT                     ;CC'S NOT SET PROPERLY
2311
2312                              ;*****************************************************************************
2313                              ;
2314                              ;       THIS TEST SETS LOCATION 0 TO 377 AND THEN USES R0 TO TEST
2315                              ;THE EVEN BYTE AND THE ODD BYTE USING SOP BYTE INSTRUCTIONS WITH MODE 1.
2316                              ;AGAIN, CONDITIONAL BRANCHES ARE USED TO VERIFY THE SETTING OF THE
2317                              ;PROPER CONDITION CODE BITS.
2318                              ;
2319                              ;*****************************************************************************
2320                              ;TEST 102       TEST MODE 1 BYTE INST. NON-MODIFYING
2321                              ;*****************************************************************************
2322  006044                      TS102:
2323  006044  005000                CLR     R0              ;POINT TO LOC 0
2324  006046  005010                CLR     (R0)            ;CLEAR LOC 0
2325  006050  105110                COMB    (R0)            ;COMPLEMENT BYTE 0
2326  006052  000277                SCC                     ;SET CC=0111
2327  006054  000250                CLN
2328  006056  105710                TSTB    (R0)            ;TRY TST ON EVEN BYTE
2329  006060  102402                BVS     SNMB1A
2330  006062  101401                BLOS    SNMB1A
2331  006064  100401                BMI     SNMB1B
2332  006066                    SNMB1A:
2333  006066  104000                EMT                     ;CC'S NOT CORRECT
2334  006070  005000            SNMB1B: CLR     R0
2335  006072  005200                INC     R0
2336  006074  000277                SCC                     ;SET CC=1011
2337  006076  000244                CLZ
2338  006100  105710                TSTB    (R0)            ;TRY TO TST AN ODD BYTE
2339  006102  102403                BVS     SNMB1C          ;CHECK CC=0100
2340  006104  103402                BCS     SNMB1C
2341  006106  100401                BMI     SNMB1C
2342  006110  001401                BEQ     TS103
2343  006112                    SNMB1C:
2344  006112  104000                EMT                     ;CC'S NOT CORRECT
2345
2346                              ;*****************************************************************************
2347                              ;
2348                              ;       THIS TEST VERIFIES THE SINGLE-OPERAND NON-MODIFYING INSTRUCTIONS
2349                              ;USING MODE 2.  IT USES THE IDENTICAL PROCEDURE EMPLOYED IN THE
2350                              ;MODE 1 TESTS.  ADDITIONALLY, THE REGISTER IS CHECKED TO ASSURE THAT
2351                              ;IT IS INCREMENTED PROPERLY.
2352                              ;
2353                              ;*****************************************************************************
2354                              ;TEST 103       TEST MODE 2 WITH SOP NON-MODIFYING
2355                              ;*****************************************************************************
2356  006114                      TS103:
2357  006114  005000                CLR     R0              ;INITIALIZE R0=0
2358  006116  005010                CLR     (R0)            ;CLEAR LOC 0
2359  006120  000277                SCC                     ;SET CC=1011
2360  006122  000244                CLZ
```

```
2361  006124  005720          TST     (R0)+           ;TRY TST W/ MODE 2
2362  006126  102403          BVS     SNM2A           ;CHECK CC=0100
2363  006130  103402          BCS     SNM2A
2364  006132  100401          BMI     SNM2A
2365  006134  001401          BEQ     SNM2B
2366  006136              SNM2A:
2367  006136  104000          EMT                     ;CC'S NOT CORRECT
2368  006140  005300  SNM2B:  DEC     R0              ;RESET R0
2369  006142  005300          DEC     R0
2370  006144  001401          BEQ     TS104
2371  006146  104000          EMT                     ;MODE 2 DID NOT INC REG CORRECTLY
2372
2373                  ;*******************************************************************************
2374                  ;
2375                  ;       THIS TEST VERIFIES MODE 2 SINGLE OPERAND NON-MODIFYING BYTE
2376                  ;INSTRUCTIONS IT USES R0 TO POINT TO LOC. 0.  WITH LOCATION 0
2377                  ;SET TO 377, THE EVEN AND ODD BYTE IS TESTED WITH TSTB INSTRUCTIONS
2378                  ;TO VERIFY THE CORRECT CC ARE SET.  THE REGISTER IS CHECKED FOR
2379                  ;PROPER INCREMENTING.
2380                  ;
2381                  ;*******************************************************************************
2382                  ;TEST 104       TEST MODE 2 - BYTE W/ SOP NON-MODIFYING
2383                  ;*******************************************************************************
2384  006150          TS104:
2385  006150  005000          CLR     R0              ;CLEAR R0
2386  006152  005010          CLR     (R0)            ;CLEAR LOC 0
2387  006154  105110          COMB    (R0)            ;SET LOC 0=377
2388  006156  000277          SCC                     ;SET CC=0111
2389  006160  000250          CLN
2390  006162  105720          TSTB    (R0)+           ;TRY TST OF EVEN BYTE
2391  006164  102402          BVS     SNMB2A
2392  006166  101401          BLOS    SNMB2A
2393  006170  100401          BMI     SNMB2B
2394  006172              SNMB2A:
2395  006172  104000          EMT                     ;CC'S NOT SET CORRECTLY
2396  006174  005300  SNMB2B:  DEC     R0              ;DECREMENT R0
2397  006176  001401          BEQ     SNMB2C
2398  006200  104000          EMT                     ;MODE 2 DID NOT INC REG CORRECTLY
2399  006202  005200  SNMB2C:  INC     R0              ;POINT TO ODD BYTE
2400  006204  000277          SCC                     ;SET CC=1011
2401  006206  000244          CLZ
2402  006210  105720          TSTB    (R0)+           ;TRY TST OF ODD BYTE
2403  006212  102403          BVS     SNMB2D          ;CHECK CC'S=0100
2404  006214  103402          BCS     SNMB2D
2405  006216  100401          BMI     SNMB2D
2406  006220  001401          BEQ     SNMB2E
2407  006222              SNMB2D:
2408  006222  104000          EMT                     ;CC'S NOT CORRECT
2409  006224  005300  SNMB2E:  DEC     R0
2410  006226  005300          DEC     R0
2411  006230  001401          BEQ     TS105
2412  006232  104000          EMT                     ;R0 DID NOT INCREMENT PROPERLY
2413
2414                  ;*******************************************************************************
2415                  ;
2416                  ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND NON-MODIFYING INSTRUCTIONS.
```

```
                                ;A POINTER IN A TABLE AT LOC. 376 IS USED TO TEST LOCATION 0.
                                ;THE CC'S AND THE REGISTER ARE CHECKED FOLLOWING THE
                                ;TST MODE 3 INSTRUCTION.
                                ;
                                ;*****************************************************************************
                                ;TEST 105       TEST MODE 3 W/ SOP NON-MODIFYING INSTS
                                ;*****************************************************************************
006234                          TS105:
006234  005000                          CLR     R0              ;R0=0
006236  005010                          CLR     (R0)            ;CLEAR LOC 0
006240  105100                          COMB    R0              ;R0=376
006242  005300                          DEC     R0
006244  000277                          SCC                     ;SET CC=1011
006246  000244                          CLZ
006250  005730                          TST     @(R0)+          ;TRY TST W/ MODE 3
006252  102403                          BVS     SNM3A           ;CHECK CC=0100
006254  103402                          BCS     SNM3A
006256  100401                          BMI     SNM3A
006260  001401                          BEQ     SNM3B
006262                          SNM3A:
006262  104000                          EMT                     ;CC'S NOT CORRECT
006264  005300                  SNM3B:  DEC     R0              ;R0=377
006266  105100                          COMB    R0              ;R0=0
006270  001401                          BEQ     TS106
006272  104000                          EMT                     ;MODE 3 DID NOT INC REG CORRECTLY
                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES SOP NON-MODIFYING BYTE INSTRUCTIONS MODE 3
                                ;LOC. 0 IS SET TO 377.  TABLE AT LOC. 402-404 IS USED TO TEST
                                ;BYTE 0 AND BYTE 1.  THE REGISTER IS CHECKED FOR PROPER INCREMENTING AND
                                ;THE CC'S ARE VERIFIED.
                                ;       THE TABLE AT LOC. 402-404 SHOULD CONTAIN 0 AND 1 BEFORE AND
                                ;AFTER THE TEST IS RUN.
                                ;
                                ;*****************************************************************************
                                ;TEST 106       TEST MODE 3 - BYTES W/ SOP NON-MODIFYING INSTS.
                                ;*****************************************************************************
006274                          TS106:
006274  005000                          CLR     R0              ;R0=0
006276  005010                          CLR     (R0)            ;CLEAR LOC 0
006300  105110                          COMB    (R0)            ;LOC. 0 =377
006302  105100                          COMB    R0
006304  005200                          INC     R0
006306  005720                          TST     (R0)+           ;R0=402
006310  000277                          SCC                     ;CC=0111
006312  000250                          CLN
006314  105730                          TSTB    @(R0)+          ;TRY TST OF EVEN BYTE
006316  102402                          BVS     SNMB3A          ;CHECK CC=1000
006320  101401                          BLOS    SNMB3A
006322  100401                          BMI     SNMB3B
006324                          SNMB3A:
006324  104000                          EMT                     ;CC'S NOT CORRECT
006326  000277                  SNMB3B: SCC                     ;SET CC=1011
006330  000244                          CLZ
006332  105730                          TSTB    @(R0)+          ;TRY TST OF ODD BYTE
```

```
 2473  006334  102403                BVS     SNMB3C          ;CHECK CC=0100
 2474  006336  103402                BCS     SNMB3C
 2475  006340  100401                BMI     SNMB3C
 2476  006342  001401                BEQ     SNMB3D
 2477  006344                    SNMB3C:
 2478  006344  104000                EMT                     ;CC'S NOT CORRECT
 2479  006346  005720            SNMB3D: TST     (R0)+           ;R0=410
 2480  006350  005710                TST     (R0)
 2481  006352  100401                BMI     TS107
 2482  006354  104000                EMT                     ;TSTB DID NOT INCREMENT R0 CORRETCLY
 2483                        ;*****************************************************************************
 2484                        ;
 2485                        ;       THIS TEST VERIFIES MODE 4 SOP NON-MODIFYING INSTRUCTIONS.
 2486                        ;LOC. 0 IS SET TO -1 AND THE CC'S ARE SET TO THE COMPLEMENT OF THE
 2487                        ;EXPECTED RESULTS.  R0 AND SET TO 2 AND A TST MODE 4 IS EXECUTED.
 2488                        ;THE CC'S ARE CHECKED WITH CONDITIONAL BRANCH INSTRUCTIONS AND THE REGISTER
 2489                        ;IS CHECKED FOR PROPER DECREMENTING.
 2490                        ;
 2491                        ;*****************************************************************************
 2492                        ;TEST 107       TEST MODE 4 W/ SOP NON-MODIFYING INSTS
 2493                        ;*****************************************************************************
 2494  006356                TS107:
 2495  006356  005000                CLR     R0              ;R0=0
 2496  006360  005010                CLR     (R0)            ;LOC 0=0
 2497  006362  005120                COM     (R0)+           ;LOC 0=-1
 2498  006364  000277                SCC                     ;SET CC=1011
 2499  006366  000244                CLZ
 2500  006370  005740                TST     -(R0)           ;TRY TST W/ MODE 4
 2501  006372  102402                BVS     SNM4A           ;CHECK CC=0100
 2502  006374  101401                BLOS    SNM4A
 2503  006376  100401                BMI     SNM4B
 2504  006400                    SNM4A:
 2505  006400  104000                EMT                     ;CC'S NOT CORRECT
 2506  006402  005700            SNM4B:  TST     R0
 2507  006404  001401                BEQ     TS110
 2508  006406  104000                EMT                     ;TST MODE 4 DID NOT DEC R0 CORRECTLY
 2509
 2510                        ;*****************************************************************************
 2511                        ;
 2512                        ;       THIS TEST VERIFIES MODE 5 SOP NON-MODIFYING INSTRUCTIONS.
 2513                        ;IT USES A POINTER AT LOC. 376 TO TEST LOC. 0.  R0 IS SET
 2514                        ;TO 400, A TST MODE 5 INSTRUCTION IS EXECUTED AND THE CC'S CHECKED.
 2515                        ;R0 IS CHECKED TO INSURE PROPER DECREMENTING.
 2516                        ;
 2517                        ;*****************************************************************************
 2518                        ;TEST 110       TEST MODE 5 W/ SOP NON-MODIFYING INSTS
 2519                        ;*****************************************************************************
 2520  006410                TS110:
 2521  006410  005000                CLR     R0              ;R0=0
 2522  006412  005010                CLR     (R0)            ;LOC 0=0
 2523  006414  005110                COM     (R0)            ;LOC 0=-1
 2524  006416  105100                COMB    R0              ;R0=377
 2525  006420  005200                INC     R0              ;R0=400
 2526  006422  000277                SCC                     ;SET CC=0111
 2527  006424  000250                CLN
 2528  006426  005750                TST     @-(R0)          ;TRY TST W/ MODE 5
```

```
 2529  006430  102402                        BVS     SNM5A           ;CHECK CC=1000
 2530  006432  101401                        BLOS    SNM5A
 2531  006434  100401                        BMI     SNM5B
 2532  006436                          SNM5A:
 2533  006436  104000                        EMT                     ;CC'S NOT SET PROPERLY
 2534  006440  005200                  SNM5B: INC     R0              ;R0=377
 2535  006442  105100                        COMB    R0              ;R0=0
 2536  006444  001401                        BEQ     TS111
 2537  006446  104000                        EMT                     ;MODE 5 DID NOT DEC R0 CORRECTLY
 2538
 2539                                  ;*************************************************************************************
 2540                                  ;
 2541                                  ;       THIS TEST VERIFIES MODE 6 SOP NON-MODIFYING INSTRUCTIONS.
 2542                                  ;R0 IS SET TO 377 AND A MODE 6 TST INSTRUCTION IS EXECUTED
 2543                                  ;USING R0 AND AN OFFSET OF -377.  THE CC'S ARE CHECKED AS WELL
 2544                                  ;AS R0 TO INSURE IT WAS NOT ALTERED.
 2545                                  ;
 2546                                  ;*************************************************************************************
 2547                                  ;TEST 111       TEST MODE 6 W/ SOP NON-MODIFYING INSTS
 2548                                  ;*************************************************************************************
 2549  006450                          TS111:
 2550  006450  005000                        CLR     R0              ;R0=0
 2551  006452  005010                        CLR     (R0)            ;LOC 0=0
 2552  006454  005110                        COM     (R0)            ;LOC 0=-1
 2553  006456  105100                        COMB    R0              ;R0=377
 2554  006460  000277                        SCC                     ;SET CC=0111
 2555  006462  000250                        CLN
 2556  006464  005760  177401               TST     -377(R0)        ;TRY TST W/ MODE 6
 2557  006470  102402                        BVS     SNM6A           ;CHECK CC=1000
 2558  006472  101401                        BLOS    SNM6A
 2559  006474  100401                        BMI     SNM6B
 2560  006476                          SNM6A:
 2561  006476  104000                        EMT                     ;CC'S INCORRECT
 2562  006500  105100                  SNM6B: COMB    R0              ;R0=0
 2563  006502  001401                        BEQ     TS112
 2564  006504  104000                        EMT                     ;TST MODE 6 INCORRECTLY CHANGED R0
```

```
2565
2566                            ;*****************************************************************************************
2567                            ;
2568                            ;       THIS TEST VERIFIES MODE 7 SOP NON-MODIFYING INSTRUCTIONS.
2569                            ;IT USES A POINTER TO LOC. 0 STORED AT LOC. 400 TO TST LOC. 0.
2570                            ;R0 IS SET TO 377 AND LOC. 0 IS TESTED THRU THE POINTER AT 400 USING
2571                            ;R0 AND AN OFFSET OF 1.
2572                            ;
2573                            ;*****************************************************************************************
2574                            ;TEST 112       TEST MODE 7 W/ SOP NON-MODIFYING INSTS.
2575                            ;*****************************************************************************************
2576  006506                    TS112:
2577  006506  005000                   CLR     R0              ;R0=0
2578  006510  005010                   CLR     (R0)            ;LOC 0=0
2579  006512  005110                   COM     (R0)            ;LOC 0=-1
2580  006514  105100                   COMB    R0              ;R0=377
2581  006516  000277                   SCC                     ;CC=0111
2582  006520  000250                   CLN
2583  006522  005770  000001          TST     @1(R0)          ;TRY TST W/ MODE 7
2584  006526  102402                   BVS     SNM7A           ;CHECK CC=1000
2585  006530  101401                   BLOS    SNM7A
2586  006532  100401                   BMI     SNM7B
2587  006534                    SNM7A:
2588  006534  104000                   EMT                     ;CC'S NOT CORRECT
2589  006536  105100            SNM7B: COMB    R0              ;R0=0
2590  006540  001401                   BEQ     TS113
2591  006542  104000                   EMT                     ;TST MODE 7 INCORRECTLY CHANGED R0
2592
2593                            ;*****************************************************************************************
2594                            ;
2595                            ;       THIS TEST VERIFIES MODE 0 DOUBLE OPERAND INSTRUCTIONS.  IT SETS
2596                            ;DATA IN R0 AND R4 AND USES THE ADD INSTRUCTION TO TEST THE DOP
2597                            ;MICROCODE.
2598                            ;
2599                            ;*****************************************************************************************
2600                            ;TEST 113       TEST MODE 0 DOUBLE-OPERAND (DOP) INSTS.
2601                            ;*****************************************************************************************
2602  006544                    TS113:
2603  006544  005000                   CLR     R0              ;R0=0
2604  006546  005100                   COM     R0              ;R0=-1
2605  006550  005004                   CLR     R4              ;R4=0
2606  006552  060004                   ADD     R0,R4           ;TRY ADD: R4=-1
2607  006554  005204                   INC     R4              ;R4=0
2608  006556  001401                   BEQ     TS114
2609  006560  104000                   EMT                     ;ADD INST. FAILED W/ MODE 0
2610
2611                            ;*****************************************************************************************
2612                            ;
2613                            ;       THIS TEST VERIFIES THE MOVE INSTRUCTION WITH MODE 0 TO MODE 0.
2614                            ;
2615                            ;*****************************************************************************************
2616                            ;TEST 114       MOV MODE 0 TO MODE 0
2617                            ;*****************************************************************************************
2618  006562                    TS114:
2619  006562  005000                   CLR     R0              ;R0=0
2620  006564  005004                   CLR     R4              ;R4=0
```

```
2621   006566  005100          COM     R0              ;R0=-1
2622   006570  010004          MOV     R0,R4           ;TRY MOVE -1 TO R4
2623   006572  005204          INC     R4              ;INC R4
2624   006574  001401          BEQ     TS115
2625   006576  104000          EMT                     ;MOVE FAILED MODE 0 TO MODE 0
2626
2627                    ;*****************************************************************************
2628                    ;
2629                    ;       THIS TEST VERIFIES THE SUBTRACT INSTRUCTION WITH MODE 0,0.
2630                    ;
2631                    ;*****************************************************************************
2632                    ;TEST 115       TEST SUB MODE 0,0
2633                    ;*****************************************************************************
2634   006600           TS115:
2635   006600  005000          CLR     R0              ;R0=0
2636   006602  005004          CLR     R4              ;R4=0
2637   006604  005204          INC     R4              ;R4=1
2638   006606  160400          SUB     R4,R0           ;TRY SUB 0,0   R0=-1
2639   006610  100003          BPL     SUB0            ;CC=1001
2640   006612  001402          BEQ     SUB0
2641   006614  102401          BVS     SUB0
2642   006616  103401          BCS     SUB0A
2643   006620           SUB0:
2644   006620  104000          EMT                     ;CONDITION CODE FAILED ON SUB
2645   006622  005200  SUB0A:   INC     R0
2646   006624  001401          BEQ     TS116
2647   006626  104000          EMT                     ;DATA RESULT OF SUB FAILED
2648
2649                    ;*****************************************************************************
2650                    ;
2651                    ;       THIS TEST QUICKLY VERIFIES THE REMAINING DOP MODIFYING INSTRUCTIONS
2652                    ;WITH MODE 0,0 TO PROVIDE A BASELINE FOR SUBSEQUENT TESTS.
2653                    ;SINGLE OPERAND INSTRUCTIONS ARE USED TO SET UP DATA IN R0 AND R4
2654                    ;BEFORE EACH OF THE SEVERAL DOP MODIFYING INSTRUCTIONS ARE USED AND
2655                    ;VERIFIED.
2656                    ;
2657                    ;*****************************************************************************
2658                    ;TEST 116       TEST ALL THE DOP INSTRUCTIONS W/ SOURCE MODE 0,0
2659                    ;*****************************************************************************
2660   006630           TS116:
2661   006630  005000          CLR     R0              ;R0=0
2662   006632  010004          MOV     R0,R4           ;TRY MOVE MODE 0,0
2663   006634  001401          BEQ     DOP0A
2664   006636  104000          EMT                     ;Z-BIT NOT SET
2665   006640  005200  DOP0A:  INC     R0              ;R0=1
2666   006642  005100          COM     R0              ;R0=177776
2667   006644  005104          COM     R4              ;R4=177777
2668   006646  040004          BIC     R0,R4           ;TRY BIC: R4=1
2669   006650  005304          DEC     R4              ;R4=0
2670   006652  001401          BEQ     DOP0B
2671   006654  104000          EMT                     ;BIC CLEAR RESULT INCORRECT
2672   006656  050004  DOP0B:  BIS     R0,R4           ;TRY BIS: R4=177777
2673   006660  005204          INC     R4
2674   006662  005204          INC     R4              ;R4=0
2675   006664  001401          BEQ     DOP0C
2676   006666  104000          EMT                     ;RESULT OF BIS INCORRECT
```

```
2677  006670  005000                DOP0C:  CLR     R0              ;R0=0
2678  006672  105100                        COMB    R0              ;R0=377
2679  006674  005004                        CLR     R4              ;R4=0
2680  006676  005104                        COM     R4              ;R4=177777
2681  006700  040004                        BIC     R0,R4           ;R4=177400
2682  006702  060004                        ADD     R0,R4           ;TRY ADD: R4=177777
2683  006704  005204                        INC     R4              ;R4=0
2684  006706  001401                        BEQ     DOP0D
2685  006710  104000                        EMT                     ;RESULT OF ADD INCORRECT
2686  006712  160004                DOP0D:  SUB     R0,R4           ;177401=R4
2687  006714  105404                        NEGB    R4              ;R4=177777
2688  006716  005204                        INC     R4              ;RD=0
2689  006720  001401                        BEQ     TS117
2690  006722  104000                        EMT                     ;RESULT OF SUB INCORRECT
2691
2692                                ;*******************************************************************************
2693                                ;
2694                                ;       THIS TEST VERIFIES MODE 0,X DOUBLE OPERAND INSTRUCTIONS.  IT SETS
2695                                ;DATA IN R0 AND LOCATION 0 AND OPERATES UPON IT USING DOP INSTRUCTIONS.
2696                                ;
2697                                ;*******************************************************************************
2698                                ;TEST 117       TEST MODE 0,X DOUBLE-OPERAND INSTRUCTIONS
2699                                ;*******************************************************************************
2700  006724                        TS117:
2701  006724  005000                        CLR     R0              ;R0=0
2702  006726  005010                        CLR     (R0)            ;LOC. 0=0
2703  006730  105110                        COMB    (R0)            ;LOC. 0=377
2704  006732  005220                        INC     (R0)+           ;LOC. 0=400   R0=2
2705  006734  005400                        NEG     R0              ;R0=-2
2706  006736  060037  000000                ADD     R0,@#0          ;TRY ADD 0,3;  LOC. 0=376
2707  006742  100403                        BMI     DOP03A          ;CC=0001?
2708  006744  001402                        BEQ     DOP03A
2709  006746  102401                        BVS     DOP03A
2710  006750  103401                        BCS     DOP03B
2711  006752                        DOP03A:
2712  006752  104000                        EMT                     ;CC'S NOT SET CORRECTLY
2713  006754  105137  000000        DOP03B: COMB    @#0             ;LOC. 0=1
2714  006760  005337  000000                DEC     @#0             ;LOC. 0=0
2715  006764  001401                        BEQ     TS120
2716  006766  104000                        EMT                     ;DATA RESULT INCORRECT
2717                                ;*******************************************************************************
2718                                ;
2719                                ;       THIS TEST VERIFIES MODE 0,0 DOP NON-MODIFYING INSTRUCTIONS.
2720                                ;R0 AND R4 ARE PRESET TO 0 AND 1 RESPECTIVELY.  COMPARE INSTRUCTIONS ARE
2721                                ;THEN EXECUTED AND CHECKED.  FIRST R4 IS COMPARED TO R0 THEN R0 TO R4.
2722                                ;
2723                                ;*******************************************************************************
2724                                ;TEST 120       TEST DOP NON-MODIFYING INST. W/ SOURCE MODE 0,0
2725                                ;*******************************************************************************
2726  006770                        TS120:
2727  006770  005000                        CLR     R0              ;R0=0
2728  006772  005004                        CLR     R4              ;R4=0
2729  006774  005204                        INC     R4              ;R4=1
2730  006776  020400                        CMP     R4,R0           ;TRY COMPARE R4 TO R0
2731  007000  003001                        BGT     DNM1
2732  007002  104000                        EMT                     ;CC'S NOT CORRECT FOR CMP
```

```
 2733  007004  020004          DNM1:   CMP     R0,R4           ;TRY COMPARE R0 TO R4
 2734  007006  002401                  BLT     DNM2
 2735  007010  104000                  EMT                     ;CC'S NOT CORRECT FOR CMP
 2736  007012  005200          DNM2:   INC     R0              ;R0=1
 2737  007014  020400                  CMP     R4,R0           ;TRY COMPARE R4=1 TO R0=1
 2738  007016  001401                  BEQ     DNM3
 2739  007020  104000                  EMT                     ;CC'S NOT CORRECT (Z=1) FOR CMP
 2740  007022  005000          DNM3:   CLR     R0              ;R0=0
 2741  007024  005100                  COM     R0              ;R0=177777
 2742  007026  005004                  CLR     R4              ;R4=0
 2743  007030  030004                  BIT     R0,R4           ;TRY BIT R0 TO R4
 2744  007032  001401                  BEQ     DNM4
 2745  007034  104000                  EMT                     ;CC'S NOT CORRECT FOR BIT
 2746  007036  005304          DNM4:   DEC     R4              ;R4=177777
 2747  007040  030004                  BIT     R0,R4           ;TRY BIT AGAIN
 2748  007042  100401                  BMI     TS121
 2749  007044  104000                  EMT                     ;CC'S NOT CORRECT FOR BIT
 2750                          ;*******************************************************************************
 2751                          ;
 2752                          ;       THIS TEST VERIFIES MODE 0,X DOUBLE OPERAND NON-MODIFYING INSTRUCTIONS.
 2753                          ;IT SETS DATA IN R0 AND LOCATION 0 AND COMPARES THEM USING DOPNM INSTRUCTIONS.
 2754                          ;
 2755                          ;*******************************************************************************
 2756                          ;TEST 121       TEST MODE 0,X DOUBLE-OPERAND NON-MODIFYING INSTS.
 2757                          ;*******************************************************************************
 2758  007046                  TS121:
 2759  007046  005000                  CLR     R0              ;R0=0
 2760  007050  005010                  CLR     (R0)            ;LOC. 0=0
 2761  007052  005110                  COM     (R0)            ;LOC. 0=177777
 2762  007054  005200                  INC     R0              ;R0=1
 2763  007056  020037  000000          CMP     R0,@#0          ;TRY CMP MODE 0,3
 2764  007062  100403                  BMI     DNM03A          ;CC=0001
 2765  007064  001402                  BEQ     DNM03A
 2766  007066  102401                  BVS     DNM03A
 2767  007070  103401                  BCS     DNM03B
 2768  007072                  DNM03A:
 2769  007072  104000                  EMT                     ;CC'S NOT SET CORRECTLY
 2770  007074  005300          DNM03B: DEC     R0
 2771  007076  001002                  BNE     DNM03C
 2772  007100  005210                  INC     (R0)
 2773  007102  001401                  BEQ     TS122
 2774  007104                  DNM03C:
 2775  007104  104000                  EMT                     ;DATA INCORRECTLY MODIFIED BY CMP
 2776                          ;*******************************************************************************
 2777                          ;
 2778                          ;       THIS TEST VERIFIES MODE 1 DOP INSTRUCTIONS.  R0 IS SET TO -1
 2779                          ;AND LOC 0 TO 1.  R4 IS THEN CLEARED AND USED TO POINT TO LOC 0.
 2780                          ;IN THE ADD MODE 1 INSTRUCTION, LOC 0 IS ADDED TO R0 AND THE
 2781                          ;RESULTS VERIFIED.
 2782                          ;
 2783                          ;*******************************************************************************
 2784                          ;TEST 122       TEST MODE 1 W/ DOP INST.
 2785                          ;*******************************************************************************
 2786  007106                  TS122:
 2787  007106  005000                  CLR     R0              ;R0=0
 2788  007110  005100                  COM     R0              ;R0=177777
```

```
 2789  007112  005004                CLR     R4              ;R4=0
 2790  007114  005014                CLR     (R4)            ;LOC 0=0
 2791  007116  005214                INC     (R4)            ;LOC 0=1
 2792  007120  061400                ADD     (R4),R0         ;TRY ADD SOURCE MODE 1
 2793  007122  001401                BEQ     TS123
 2794  007124  104000                EMT                     ;RESULT OF ADD INCORRECT
 2795
 2796                        ;*****************************************************************************
 2797                        ;
 2798                        ;       THIS TEST VERIFIES MODE 1 DOP BYTE INSTRUCTIONS WHICH ADDRESS
 2799                        ;EVEN BYTES.  LOC. 0 IS SET TO -1 AND R4 IS CLEARED.  THEN R4 IS
 2800                        ;SET TO -1 USING A BISB THRU R0 WITH MODE 1.
 2801                        ;
 2802                        ;*****************************************************************************
 2803                        ;TEST 123       TEST MODE 1 - EVEN BYTE W/ DOP INSTS.
 2804                        ;*****************************************************************************
 2805  007126                TS123:
 2806  007126  005000                CLR     R0              ;R0=0
 2807  007130  005010                CLR     (R0)            ;LOC. 0=0
 2808  007132  005110                COM     (R0)            ;LOC. 0=177777
 2809  007134  005004                CLR     R4              ;R4=0
 2810  007136  151004                BISB    (R0),R4         ;TRY MODE 1- EVEN BYTE W/ DOP
 2811  007140  105104                COMB    R4              ;R4=0
 2812  007142  001401                BEQ     TS124
 2813  007144  104000                EMT                     ;RESULT OF BISB IS INCORRECT
 2814
 2815                        ;*****************************************************************************
 2816                        ;
 2817                        ;       THIS TEST VERIFIES MODE 1 DOP NON-MODIFYING INSTRUCTIONS
 2818                        ;WHICH ADDRESS EVEN BYTES.  LOC. 0 IS SET TO -1 AND R0 IS CLEARED
 2819                        ;AND USED AS THE ADDRESSING REGISTER.  R4 IS SET TO 377 AND A
 2820                        ;MODE 1,0 CMPB INSTRUCTION IS USED THE RESULTS VERIFIED.
 2821                        ;
 2822                        ;*****************************************************************************
 2823                        ;TEST 124       TEST MODE 1 - EVEN BYTE W/ DOP NON-MODIFYING INST.
 2824                        ;*****************************************************************************
 2825  007146                TS124:
 2826  007146  005000                CLR     R0              ;R0=0
 2827  007150  005010                CLR     (R0)            ;LOC 0=0
 2828  007152  005110                COM     (R0)            ;LOC 0=177777
 2829  007154  005004                CLR     R4              ;R4=0
 2830  007156  105104                COMB    R4              ;R4=377
 2831  007160  121004                CMPB    (R0),R4         ;TRY MODE 1 - EVEN BYTE W/ DOP NON-MODIFYING
 2832  007162  001401                BEQ     TS125
 2833  007164  104000                EMT                     ;RESULT OF CMPB INCORRECT
 2834
 2835                        ;*****************************************************************************
 2836                        ;
 2837                        ;       THIS TEST VERIFIES MODE 1,0 MOVB INSTRUCTIONS
 2838                        ;WHICH ADDRESS EVEN BYTES.  LOC. 0 IS SET TO 177400, R0 IS CLEARED AND
 2839                        ;R4 IS SET TO -1.  MOVB ARE USED TO MOVE BYTE 0 TO R4.  THIS
 2840                        ;VERIFIES THAT THE PROPER BYTE WAS SELECTED AND THAT THE SIGN-X-TEND
 2841                        ;FUNCTION WITH MODE 0.
 2842                        ;       THEN LOC. 0 IS COMPLEMENTED AND THE SAME PROCEDURE EXERCISES
 2843                        ;THE LOGIC FOR COMPLEMENTARY DATA.
 2844                        ;       THIS TEST EXERCISES UNIQUE MICROCODE.
```

```
2845
2846
2847
2848
2849  007166
2850  007166  005000          ;
2851  007170  005010          ;*****************************************************************************
2852  007172  105110          ;TEST 125       TEST MOV INSTRUCTION MODE 1,0 EVEN BYTE
2853  007174  005110          ;*****************************************************************************
2854  007176  005004          TS125:
2855  007200  005104                  CLR     R0              ;R0=0
2856  007202  111004                  CLR     (R0)            ;LOC 0=0
2857  007204  005704                  COMB    (R0)            ;LOC 0=177400
2858  007206  001401                  COM     (R0)
2859  007210  104000                  CLR     R4              ;R4=0
2860  007212  005110                  COM     R4              ;R4=177777
2861  007214  111004                  MOVB    (R0),R4         ;R4=0
2862  007216  100401                  TST     R4              ;CHECK SIGN OF WORD
2863  007220  104000                  BEQ     DOP1
2864                                   EMT                     ;MOVB SHOULD SIGN X-TEND
2865                           DOP1:   COM     (R0)            ;LOC 0=177777
2866                                   MOVB    (R0),R4         ;DO MOVB W/ EVEN BYTE
2867                                   BMI     TS126
2868                                   EMT                     ;MOVB SHOULD SIGN X-TEND
2869
2870                           ;*****************************************************************************
2871                           ;
2872                           ;       THIS TEST VERIFIES MODE 1 DOP INSTRUCTIONS WHICH REFERENCE
2873                           ;ODD BYTES.  LOC. 0 IS SET TO 177400.  R0 IS SET TO 0 AND R4 IS
2874                           ;SET TO 1.  THE BISB INSTRUCTION USES THE DATA IN BYTE 1 TO SET BYTE 0.
2875  007222                   ;THE RESULT IS CHECKED BY INCREMENTING THE WORD (LOC. 0) TO ZERO.
2876  007222  005000           ;
2877  007224  005010           ;*****************************************************************************
2878  007226  005004           ;TEST 126       TEST MODE 1-ODD BYTE W/ DOP INSTS.
2879  007230  005204           ;*****************************************************************************
2880  007232  105114           TS126:
2881  007234  151410                  CLR     R0              ;R0=0
2882  007236  005210                  CLR     (R0)            ;LOC. 0=0
2883  007240  001401                  CLR     R4              ;R4=0
2884  007242  104000                  INC     R4              ;R4=1
2885                                   COMB    (R4)            ;LOC. 0=177400
2886                                   BISB    (R4),(R0)       ;TRY TO BIS LOW ORDER BITS W/ MODE 1
2887                                   INC     (R0)            ;CHECK RESULT
2888                                   BEQ     TS127
2889                                   EMT                     ;RESULT OF BISB INCORRECT
2890
2891                           ;*****************************************************************************
2892                           ;
2893                           ;       THIS TEST VERIFIES MODE 2 DOP INSTRUCTIONS.  LOC. 0 IS SET TO -1.
2894                           ;R0 IS CLEARED AND USED AS THE MODE 2 ADDRESSING REGISTER TO MOVE LOC. 0
2895                           ;TO R7.  THE DATA RESULTS ARE VERIFIED AND THE INCREMENTING OF THE REGISTER
2896  007244                   ;IS CHECKED.
2897  007244  005000           ;
2898  007246  005010           ;*****************************************************************************
2899  007250  005110           ;TEST 127       TEST MODE 2 W/ DOP INSTS.
2900  007252  012004           ;*****************************************************************************
                           TS127:
                                   CLR     R0              ;R0=0
                                   CLR     (R0)            ;LOC. 0=0
                                   COM     (R0)            ;LOC. 0=177777
                                   MOV     (R0)+,R4        ;TRY MOVE MODE 2,0
```

```
2901  007254  005204                    INC     R4              ;CHECK R4
2902  007256  001401                    BEQ     DOP2
2903  007260  104000                    EMT                     ;RESULT OF MOV INST INCORRECT
2904  007262  005300            DOP2:   DEC     R0              ;TEST R0 AFTER MODE 2
2905  007264  005300                    DEC     R0
2906  007266  001401                    BEQ     TS130
2907  007270  104000                    EMT                     ;REGISTER NOT INCREMENTED IN MODE 2
2908
2909                            ;*****************************************************************************
2910                            ;
2911                            ;       THIS TEST VERIFIES MODE 2 DOP BYTE INSTRUCTIONS WHICH ADDRESS
2912                            ;EVEN BYTES.  LOC. 0 IS SET TO -1.  R0 IS CLEARED AND USED AS THE
2913                            ;ADDRESSING REGISTER IN A TEST WHICH TRIES TO CLEAR BYTE 1 USING
2914                            ;BYTE 0 DATA AND A BICB.  UNIQUE IN THIS TEST IS USE OF THE
2915                            ;SAME ADDRESSING REGISTER FOR BOTH SOURCE AND DESTINATION.  THE SOURCE AND
2916                            ;DESTINATION IS CHECKED TO INSURE PROPER FUNCTIONING.
2917                            ;
2918                            ;*****************************************************************************
2919                            ;TEST 130       TEST MODE 2 - EVEN BYTE W/ DOP INST.
2920                            ;*****************************************************************************
2921  007272                    TS130:
2922  007272  005000                    CLR     R0              ;R0=0
2923  007274  010010                    MOV     R0,(R0)         ;LOC. 0=0
2924  007276  005110                    COM     (R0)            ;LOC. 0=177777
2925  007300  142010                    BICB    (R0)+,(R0)      ;TRY TO CLEAR BYTE 1 FROM BYTE 0 W/ BICB
2926  007302  105737  000001            TSTB    @#1             ;CHECK RESULT
2927  007306  001401                    BEQ     DOPB2A
2928  007310  104000                    EMT                     ;BICB DESTINATION INCORRECT
2929  007312  105137  000000    DOPB2A: COMB    @#0             ;CHECK BICB SOURCE
2930  007316  001401                    BEQ     TS131
2931  007320  104000                    EMT                     ;BICB SOURCE INCORRECTLY CHANGED
2932                            ;*****************************************************************************
2933                            ;
2934                            ;       THIS TEST VERIFIES MODE 2 DOP BYTE INSTRUCTIONS WHICH REFERENCE
2935                            ;ODD BYTES.  R0 IS SET TO 1, LOC. 0 IS SET TO 177400, AND R4 IS CLEARED.
2936                            ;A MODE 2 MOVB USES R0 TO MOVE BYTE 1 TO R4.  AN INCREMENT
2937                            ;IS USED TO CHECK THAT THE PROPER BYTE WAS MOVED AND SIGN X-TENDED.
2938                            ;
2939                            ;*****************************************************************************
2940                            ;TEST 131       TEST MODE 2 - ODD BYTE W/ DOP INST.
2941                            ;*****************************************************************************
2942  007322                    TS131:
2943  007322  005000                    CLR     R0              ;R0=0
2944  007324  005004                    CLR     R4              ;R4=0
2945  007326  005010                    CLR     (R0)            ;LOC. 0=0
2946  007330  005110                    COM     (R0)            ;LOC. 0=177777
2947  007332  105120                    COMB    (R0)+           ;LOC 0=177400; R0=1
2948  007334  112004                    MOVB    (R0)+,R4        ;TRY DOP MODE 2 W/ ODD BYTE
2949  007336  005204                    INC     R4              ;CHECK RESULT OF MOVB
2950  007340  001401                    BEQ     DOPB2B
2951  007342  104000                    EMT                     ;RESULT OF MOVB INCORRECT
2952  007344  005740    DOPB2B: TST     -(R0)           ;BUMP R0 DOWN BY 2
2953  007346  005700                    TST     R0              ;CHECK R0
2954  007350  001401                    BEQ     TS132
2955  007352  104000                    EMT                     ;MODE 2 BYTE DID NOT INCREMENT REG. CORRECTLY
2956                            ;*****************************************************************************
```

```
                                        ;
                                        ;       THIS TEST VERIFIES MODE 3 DOUBLE-OPERAND INSTRUCTIONS.
                                        ;LOC. 0 IS LOADED WITH ALTERNATING ZEROES AND ONES; AND R0 IS LOADED
                                        ;WITH ALTERNATING ONES AND ZEROES.  A MODE 3 BIS IS USED TO SET R0
                                        ;TO -1 BY USING LOC. 0 AS THE SOURCE TO BIS THE ZEROES IN R0.  THE
                                        ;RESULT IS TESTED BY INCREMENTING R0 AND CHECKING FOR ZERO.
                                        ;
                                        ;*****************************************************************************
                                        ;TEST 132       TEST MODE 3 W/ DOP INSTS.
                                        ;*****************************************************************************
007354                                  TS132:
007354  012737  052525  000000                MOV     #052525,@#0     ;MOVE 52525 TO LOC. 0
007362  012700  125252                      MOV     #125252,R0      ;SET ALT. ONE AND ZERO IN R0
007366  053700  000000                      BIS     @#0,R0          ;TRY TO SET ALL OTHER BITS W/ MODE 3
007372  005200                            INC     R0              ;TEST RESULT
007374  001401                            BEQ     TS133
007376  104000                            EMT                     ;BIS W/ MODE 3 INCORRECT RESULT
                                        ;*****************************************************************************
                                        ;
                                        ;       THIS TEST VERIFIES MODE 3 DOUBLE OPERAND BYTE INSTRUCTIONS WHICH
                                        ;ADDRESS EVEN BYTES.  BYTE 0 IS SET TO ALTERNATING 1'S AND 0'S; BYTE 1,
                                        ;ALTERNATING 0'S AND 1'S.  R0 IS CLEARED AND A BISB IS USED TO
                                        ;SET THE LOW BYTE OF R0 TO 252.
                                        ;
                                        ;*****************************************************************************
                                        ;TEST 133       TEST MODE 3 - EVEN BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
007400                                  TS133:
007400  012737  052652  000000                MOV     #52652,@#0      ;NOVE 1'S AND 0' PATTERN TO LOC. 0
007406  005000                            CLR     R0              ;R0=0
007410  153700  000000                      BISB    @#0,R0          ;TRY R0=252 W/ MODE 3 - EVEN BYTE
007414  022700  000252                      CMP     #252,R0         ;BISB W/ EVEN BYTE SUCCESSFUL?
007420  001401                            BEQ     TS134
007422  104000                            EMT                     ;BISB W/ MODE 3 - EVEN BYTE FAILED
                                        ;*****************************************************************************
                                        ;
                                        ;       THIS TEST VERIFIES MODE 3 DOUBLE OPERAND BYTE INSTRUCTIONS
                                        ;WHICH ADDRESS ODD BYTES.  THE SAME PROCEDURE USED IN PREVIOUS
                                        ;TEST IS USED HERE.  THIS TIME BYTE 1 IS USED AS THE SOURCE BYTE.
                                        ;THE EXPECTED RESULT IS:  R0 = 125.
                                        ;
                                        ;*****************************************************************************
                                        ;TEST 134       TEST MODE 3 - ODD BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
007424                                  TS134:
007424  012737  052652  000000                MOV     #52652,@#0      ;MOVE 1'S AND 0'S PATTERN TO LOC 0
007432  005000                            CLR     R0              ;R0=0
007434  153700  000001                      BISB    @#1,R0          ;TRY R0=152 W/ MODE 3 - ODD BYTE
007440  022700  000125                      CMP     #125,R0         ;R0=125?
007444  001401                            BEQ     TS135
007446  104000                            EMT                     ;BISB W/ MODE 3 - ODD BYTE FAILED
                                        ;*****************************************************************************
                                        ;TEST 135       TEST DEST. MODE 0-BYTE W/ DOP NON-MODIFYING MST
                                        ;*****************************************************************************
007450                                  TS135:
```

```
 3013  007450  005000
 3014  007452  105100
 3015  007454  000263
 3016  007456  132700  000200
 3017  007462  001403
 3018  007464  102402
 3019  007466  103001
 3020  007470  100401
 3021  007472
 3022  007472  104000
 3023  007474  105100
 3024  007476  001401
 3025  007500  104000
 3026
 3027
 3028
 3029
 3030  007502
 3031  007502  005000
 3032  007504  005010
 3033  007506  000241
 3034  007510  032710  177777
 3035  007514  100403
 3036  007516  102402
 3037  007520  103401
 3038  007522  001401
 3039  007524
 3040  007524  104000
 3041  007526  005710
 3042  007530  001401
 3043  007532  104000
 3044
 3045
 3046
 3047
 3048  007534
 3049  007534  005000
 3050  007536  005010
 3051  007540  052710  125252
 3052  007544  032720  077777
 3053  007550  102402
 3054  007552  001401
 3055  007554  100001
 3056  007556
 3057  007556  104000
 3058  007560  005300
 3059  007562  005300
 3060  007564  001401
 3061  007566
 3062  007566  104000
 3063  007570  022710  125252
 3064  007574  001401
 3065  007576  104000
 3066
 3067
 3068
```

```
        CLR     R0              ;R0=0
        COMB    R0              ;R0=377
        +SEC!SEV                ;SET C AND V BITS
        BITB    #200,R0         ;TRY DOPNM DEST. MODE 0-BYTE
        BEQ     DNMB0A          ;BR TO ERROR IF Z BIT SET
        BVS     DNMB0A          ;BR TO ERROR IF V BIT SET
        BCC     DNMB0A          ;BR TO ERROR IF C BIT CLEAR.
        BMI     DNMB0B
DNMB0A:
        EMT                     ;CC'S INCORRECT
DNMB0B: COMB    R0              ;CHECK DESTINATION DATA
        BEQ     TS136
        EMT                     ;DEST. DATA MODIFIED

;*************************************************************************************
;TEST 136       TEST DEST. MODE 1 W/ DOP NON-MODIFYING INST
;*************************************************************************************
TS136:
        CLR     R0              ;R0=0
        CLR     (R0)            ;LOC. 0=0
        CLC                     ;CLEAR C BIT
        BIT     #177777,(R0)    ;TRY DOPNM DEST. MODE 1
        BMI     DNM1A           ;BR TO ERROR IF N BIT SET
        BVS     DNM1A           ;BR TO ERROR IF V BIT SET
        BCS     DNM1A           ;BR TO ERROR IF C BIT SET
        BEQ     DNM1B
DNM1A:
        EMT                     ;COND. CODES INCORRECT
DNM1B:  TST     (R0)            ;CHECK TEST DATA
        BEQ     TS137
        EMT                     ;DESTINATION DATA MODIFIED

;*************************************************************************************
;TEST 137       TEST DEST, MODE 2 W/ DOP NON-MODIFYING INST.
;*************************************************************************************
TS137:
        CLR     R0              ;R0=0
        CLR     (R0)            ;LOC. 0=0
        BIS     #125252,(R0)    ;LOC. 0=125252
        BIT     #77777,(R0)+    ;TRY DOPNM INST W/ MODE 2
        BVS     DNM2A           ;BR TO ERROR IF V BIT SET
        BEQ     DNM2A           ;BR TO ERROR IF Z-BIT SET
        BPL     DNM2B
DNM2A:
        EMT                     ;COND. CODES INCORRECT
DNM2B:  DEC     R0              ;DECREMENT R0 TO CHECK IT.
        DEC     R0
        BEQ     DNM2D
DNM2C:
        EMT                     ;MODE 2 REGISTER NOT INCREMENTED BY 2
DNM2D:  CMP     #125252,(R0)    ;CHECK DEST. DATA
        BEQ     TS140
        EMT                     ;DEST. DATA MODIFIED

;*************************************************************************************
;TEST 140       TEST DEST. MODE 2-BYTE, W/DOP NON-MODIFYING INST
```

```
3069
3070  007600
3071  007600  005000                  ;*****************************************************************************
3072  007602  005010                  TS140:
3073  007604  052710  052652                CLR     R0              ;R0=0
3074  007610  000263                        CLR     (R0)            ;LOC. 0=0
3075  007612  132720  000201                BIS     #52652,(R0)     ;LOC. 0=52652
3076  007616  001403                        +SEC!SEV                ;SET C AND V BITS
3077  007620  103002                        BITB    #201,(R0)+      ;TRY DOPNM INST. W/ MODE 2 EVEN BYTE
3078  007622  102401                        BEQ     DNMB2A          ;BR TO ERROR IF Z-BIT SET
3079  007624  100401                        BCC     DNMB2A          ;BR TO ERROR IF C-BIT CLEAR
3080  007626                               BVS     DNMB2A          ;BR TO ERROR IF V-BIT SET
3081  007626  104000                        BMI     DNMB2B
3082  007630  005300                DNMB2A:
3083  007632  001401                        EMT                     ;COND. CODES INCORRECT
3084  007634  104000                DNMB2B: DEC     R0              ;CHECK DEST. REGISTER.
3085  007636  005200                        BEQ     DNMB2C
3086  007640  132720  000201                EMT                     ;DEST. REGISTER NOT INCREMENTED BY 1
3087  007644  001402                DNMB2C: INC     R0              ;R0=1
3088  007646  102401                        BITB    #201,(R0)+      ;TRY DOPNM INST. W/MODE 2-ODD BYTE
3089  007650  100001                        BEQ     DNMB2D  ;BR TO ERROR IF Z-BIT SET
3090  007652                               BVS     DNMB2D          ;BR TO ERROR IF V-BIT SET
3091  007652  104000                        BPL     DNMB2E
3092  007654  005300                DNMB2D:
3093  007656  005300                        EMT                     ;COND. CODES INCORRECT
3094  007660  001401                DNMB2E: DEC     R0              ;DEC R0 TO CHECK IT.
3095  007662  104000                        DEC     R0
3096  007664  022710  052652                BEQ     DNMB2F
3097  007670  001401                        EMT                     ;DEST. REGISTER NOT INCREMENTED BY 1
3098  007672  104000                DNMB2F: CMP     #52652,(R0)     ;CHECK DEST. DATA IS UNMODIFIED
3099                                       BEQ     TS141
3100                                       EMT                     ;DEST. DATA WAS MODIFIED.
3101
3102                                 ;*****************************************************************************
3103                                 ;TEST 141       TEST DEST. MODE 3-BYTES W/DOP NON-MODIFYING INST.
3104  007674                         ;*****************************************************************************
3105  007674  005000                TS141:
3106  007676  005010                        CLR     R0              ;R0=0
3107  007700  052710  125125                CLR     (R0)            ;LOC. 0=0
3108  007704  105100                        BIS     #125125,(R0)    ;LOC. 0=125125
3109  007706  005200                        COMB    R0              ;R0=377
3110  007710  005010                        INC     R0              ;R0=400
3111  007712  000263                        CLR     (R0)            ;LOC. 400=0
3112  007714  132730  000201                +SEC!SEV                ;C-BIT=V-BIT=1
3113  007720  001403                        BITB    #201,@(R0)+     ;TRY DOPNM W/MODE 3-EVEN BYTE
3114  007722  102402                        BEQ     DNMB3A          ;BR TO ERROR IF Z BIT SET
3115  007724  103001                        BVS     DNMB3A          ;BR TO ERROR IF V BIT SET
3116  007726  100001                        BCC     DNMB3A          ;BR TO ERROR IF C BIT CLEAR
3117  007730                               BPL     DNMB3B
3118  007730  104000                DNMB3A:
3119  007732  022700  000402                EMT                     ;COND. CODES INCORRECT
3120  007736  001401                DNMB3B: CMP     #402,R0         ;CHECK DEST. REGISTER INC. BY 2 AND INC BY 2 AGAIN
3121  007740  104000                        BEQ     DNMB3C
3122  007742  005200                        EMT                     ;DEST. REGISTER NOT INCREMENTED BY 2
3123  007744  005200                DNMB3C: INC     R0              ;R0=404
3124  007746  132730  000201                INC     R0
                                       BITB    #201,@(R0)+     ;TRY DOPNM DEST MODE 3-BYTE(ODD)
```

```
3125  007752  001402                    BEQ     DNMB3D          ;BR TO ERROR IF Z BIT SET
3126  007754  102401                    BVS     DNMB3D          ;BR TO ERROR IF V BIT SET
3127  007756  100401                    BMI     DNMB3E
3128  007760                          DNMB3D:
3129  007760  104000                    EMT                     ;COND. CODES INCORRECT
3130  007762  005004                  DNMB3E: CLR     R4              ;R4=0
3131  007764  022714  125125            CMP     #125125,(R4)    ;CHECK DEST. DATA
3132  007770  001401                    BEQ     TS142
3133  007772  104000                    EMT                     ;DEST. DATA MODIFIED
3134
3135                                  ;*************************************************************************************
3136                                  ;TEST 142       TEST DEST. MODE 4 W/DOP NON-MODIFYING INST.
3137                                  ;*************************************************************************************
3138  007774                          TS142:
3139  007774  005000                    CLR     R0              ;R0=0
3140  007776  005010                    CLR     (R0)            ;LOC. 0=0
3141  010000  052710  125252            BIS     #125252,(R0)    ;LOC. 0=125125
3142  010004  052700  000002            BIS     #2,R0           ;R0=2
3143  010010  000277                    SCC                     ;SET ALL COND. CODE BITS
3144  010012  032740  020000            BIT     #20000,-(R0)    ;TRY DOPNM W/ MODE 4
3145  010016  100403                    BMI     DNM4A           ;BR TO ERROR IF N-BIT SET
3146  010020  102402                    BVS     DNM4A           ;BR TO ERROR IF V-BIT SET
3147  010022  103001                    BCC     DNM4A           ;BR TO ERROR IF C-BIT CHAR
3148  010024  001001                    BNE     DNM4B
3149  010026                          DNM4A:
3150  010026  104000                    EMT                     ;COND. CODES INCORRECT
3151  010030  005700                  DNM4B:  TST     R0              ;CHECK DEST. REGISTER
3152  010032  001401                    BEQ     DNM4C
3153  010034  104000                    EMT                     ;DEST. REGISTER NOT DECREMENTED BY 2
3154  010036  022737  125252  000000  DNM4C:  CMP     #125252,@#0     ;CHECK DEST. DATA
3155  010044  001401                    BEQ     TS143
3156  010046  104000                    EMT                     ;DEST. DATA MODIFIED
3157
3158                                  ;*************************************************************************************
3159                                  ;TEST 143       TEST DEST. MODE 4-BYTE W/ DOP NON-MODIFYING INST.
3160                                  ;*************************************************************************************
3161  010050                          TS143:
3162  010050  005000                    CLR     R0              ;R0=0
3163  010052  005010                    CLR     (R0)            ;LOC. 0=0
3164  010054  052710  052652            BIS     #52652,(R0)     ;LOC. 0=52652
3165  010060  052700  000002            BIS     #2,R0           ;R0=2
3166  010064  000257                    CCC                     ;COND. CODES=0
3167  010066  132740  000201            BITB    #201,-(R0)      ;TRY DOPNM INST W/MODE 4 ODD BYTE
3168  010072  102403                    BVS     DNMB4A          ;BR TO ERROR IF V BIT SET
3169  010074  001402                    BEQ     DNMB4A  ;BR TO ERROR IF Z BIT SET
3170  010076  103401                    BCS     DNMB4A          ;BR TO ERROR IF C BIT SET
3171  010100  001001                    BNE     DNMB4B
3172  010102                          DNMB4A:
3173  010102  104000                    EMT                     ;COND. CODES INCORRECT
3174  010104  022700  000001          DNMB4B: CMP     #1,R0           ;CHECK DEST. REGISTER
3175  010110  001401                    BEQ     DNMB4C
3176  010112  104000                    EMT                     ;DEST REG. NOT DECREMENTED BY 1
3177  010114  132740  000201          DNMB4C: BITB    #201,-(R0)      ;TRY DOPNM INST. W/MODE 4 EVEN BYTE
3178  010120  001401                    BEQ     DNMB4D          ;BR TO ERROR IF Z-BIT SET
3179  010122  100401                    BMI     DNMB4E
3180  010124                          DNMB4D:
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3181  010124  104000                          EMT                     ;COND. CODES INCORRECT
3182  010126  005700                DNMB4E:   TST     R0              ;CHECK DEST. REGISTER
3183  010130  001401                          BEQ     DNMB4F
3184  010132  104000                          EMT                     ;DEST. REG. NOT DECREMENTED BY 1
3185  010134  022710  052652        DNMB4F:   CMP     #52652,(R0)     ;CHECK DESTINATION DATA
3186  010140  001401                          BEQ     TS144
3187  010142  104000                          EMT                     ;DEST. DATA MODIFIED
3188
3189                                ;*************************************************************************
3190                                ;TEST 144       TEST DEST MODE 5 W/DOP NON-MODIFYING INST.
3191                                ;*************************************************************************
3192  010144                        TS144:
3193  010144  005000                          CLR     R0              ;R0=0
3194  010146  005010                          CLR     (R0)            ;LOC 0=0
3195  010150  052710  100000                  BIS     #100000,(R0)    ;LOC. 0=100000
3196  010154  052700  000402                  BIS     #402,R0         ;R0=2
3197  010160  000277                          SCC                     ;SET ALL COND. CODE BITS
3198  010162  032750  100000                  BIT     #100000,@-(R0)  ;TRY DOPNM W/MODE 5
3199  010166  102403                          BVS     DNM5A           ;BR TO ERROR IF V-BIT SET
3200  010170  103002                          BCC     DNM5A           ;BR TO ERROR IF C-BIT CLEAR
3201  010172  001401                          BEQ     DNM5A           ;BR TO ERROR IF Z-BIT SET
3202  010174  100401                          BMI     DNM5B
3203  010176                        DNM5A:
3204  010176  104000                          EMT                     ;COND, CODES INCORRECT
3205  010200  022700  000400        DNM5B:    CMP #400,R0             ;CHECK DEST. REGISTER
3206  010204  001401                          BEQ     DNM5C
3207  010206  104000                          EMT                     ;DEST. REGISTER NOT DECREMENTED BY 2
3208  010210  022737  100000  000000 DNM5C:   CMP     #100000,@#0     ;CHECK DESTINATION DATA
3209  010216  001401                          BEQ     TS145
3210  010220  104000                          EMT                     ;DEST. DATA INCORRECTLY MODIFIED
3211
3212                                ;*************************************************************************
3213                                ;TEST 145       TEST DEST. MODE 6 W/DOP NON-MODIFYING INST.
3214                                ;*************************************************************************
3215  010222                        TS145:
3216  010222  005000                          CLR     R0              ;R0=0
3217  010224  005010                          CLR     (R0)            ;LOC> 0=0
3218  010226  052710  000001                  BIS     #1,(R0)         ;LOC. 0=1
3219  010232  005100                          COM     R0              ;R0=-1 C-BIT=1
3220  010234  032760  000001  000001         BIT     #1,1(R0)        ;TRY DOPNM W/MODE 6
3221  010242  001403                          BEQ     DNM6A           ;BR TO ERROR IF Z-BIT SET
3222  010244  102402                          BVS     DNM6A           ;BR TO ERROR IF V-BIT SET
3223  010246  103001                          BCC     DNM6A           ;BR TO ERROR IF C-BIT CLEAR
3224  010250  100001                          BPL     DNM6B
3225  010252                        DNM6A:
3226  010252  104000                          EMT                     ;COND CODES INCORRECT
3227  010254  022700  177777        DNM6B:    CMP     #-1,R0          ;CHECK DEST. REGISTER
3228  010260  001401                          BEQ     DNM6C
3229  010262  104000                          EMT                     ;DEST. REGISTER MODIFIED
3230  010264  022737  000001  000000 DNM6C:   CMP     #1,@#0          ;CHECK DEST. DATA
3231  010272  001401                          BEQ     TS146
3232  010274  104000                          EMT                     ;DEST. DATA MODIFIED
3233
3234                                ;*************************************************************************
3235                                ;TEST 146       TEST DEST MODE 7 W/DOP NON-MODIFYING INST.
3236                                ;*************************************************************************
```

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3237  010276                          TS146:
3238  010276  005000                          CLR     R0              ;R0=0
3239  010300  005010                          CLR     (R0)            ;LOC. 0=0 C-BIT=0
3240  010302  052710  125125                 BIS     #125125,(R0)    ;LOC. 0=125125
3241  010306  052700  000001                 BIS     #1,R0           ;R0=1
3242  010312  132770  000125  000403        BITB    #125,@403(R0)   ;TRY DOPNM W/MODE 7
3243  010320  102403                          BVS     DNM7A           ;BR TO ERROR IF V-BIT SET
3244  010322  100402                          BMI     DNM7A           ;BR TO ERROR IF N-BIT SET
3245  010324  103401                          BCS     DNM7A           ;BR TO ERROR IF C-BIT SET
3246  010326  001401                          BEQ     DNM7B
3247  010330                          DNM7A:
3248  010330  104000                          EMT                     ;COND. CODES INCORRECT
3249  010332  022700  000001          DNM7B:  CMP     #1,R0           ;CHECK DEST. REGISTER
3250  010336  001401                          BEQ     DNM7C
3251  010340  104000                          EMT                     ;DESTINATION REGISTER MODIFIED
3252  010342  022737  125125  000000  DNM7C:  CMP     #125125,@#0     ;CHECK DEST. DATA
3253  010350  001401                          BEQ     TS147
3254  010352  104000                          EMT                     ;DEST. DATA INCORRECT
3255
3256                                  ;*******************************************************************************
3257                                  ;
3258                                  ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 1 INSTRUCTION.
3259                                  ;DATA IS SET IN R0 USING SOP INSTRUCTIONS AND THEN MOVED TO LOC. 0
3260                                  ;USING MOV SRC MODE 0, DEST. MODE 1.
3261                                  ;
3262                                  ;*******************************************************************************
3263                                  ;TEST 147       TEST MOV DESTINATION MODE 1
3264                                  ;*******************************************************************************
3265  010354                          TS147:
3266  010354  005000                          CLR     R0              ;R0=0
3267  010356  005010                          CLR     (R0)            ;LOC. 0=0
3268  010360  005100                          COM     R0              ;R0=-1
3269  010362  005004                          CLR     R4              ;R4 POINTS TO LOC. 0
3270  010364  010014                          MOV     R0,(R4)         ;TRY MOVE MODE 0,1
3271  010366  102402                          BVS     MDM1A           ;BR TO ERROR IF V SET
3272  010370  001401                          BEQ     MDM1A           ;BR TO ERROR IF Z SET
3273  010372  100401                          BMI     MDM1B
3274  010374                          MDM1A:
3275  010374  104000                          EMT                     ;CONDITION CODE NOT CORRECT
3276  010376  005704                  MDM1B:  TST     R4
3277  010400  001401                          BEQ     TS150
3278  010402  104000                          EMT                     ;DESTINATION REGISTER INCORRECTLY ALTERED
3279
3280                                  ;*******************************************************************************
3281                                  ;
3282                                  ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 2 INSTRUCTION.
3283                                  ;       DATA IS SET IN R0 USING SOP INSTRUCTIONS AND THEN MOVED
3284                                  ;       TO LOCATION 0 USING MOV SRC MODE 0, DEST. MODE 1.
3285                                  ;
3286                                  ;*******************************************************************************
3287                                  ;TEST 150       TEST MOV DESTINATION MODE 2
3288                                  ;*******************************************************************************
3289  010404                          TS150:
3290  010404  005000                          CLR     R0              ;R0=0
3291  010406  005001                          CLR     R1              ;R1=0
3292  010410  005010                          CLR     (R0)            ;LOC.0=0
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3293  010412  005110                        COM     (R0)            ;LOC. 0= 1
3294  010414  010120                        MOV     R1,(R0)+        ;TRY MOVE MODE 0,2
3295  010416  100402                        BMI     MDM2A           ;BR TO ERROR IF N SET
3296  010420  102401                        BVS     MDM2A           ;BR TO ERROR IF V SET
3297  010422  001401                        BEQ     MDM2B
3298  010424                        MDM2A:
3299  010424  104000                        EMT                     ;CC'S INCORRECT
3300  010426  005300                MDM2B:  DEC     R0
3301  010430  005300                        DEC     R0
3302  010432  001401                        BEQ     MDM2D
3303  010434                        MDM2C:
3304  010434  104000                        EMT                     ;DESTINATION REGISTER NOT INCREMENTED PROPERLY
3305  010436  005737  000000        MDM2D:  TST     @#0
3306  010442  001401                        BEQ     TS151
3307  010444  104000                        EMT                     ;DESTINATION DATA INCORRECT
3308
3309                                ;*******************************************************************************
3310                                ;
3311                                ;       THIS TEST VERIFIES DESTINATION MODE 2 W/MOVB INSTS. TWO DIFFERENT MOVB
3312                                ;INSTRUCTIONS ARE USED TO MOVE A TEST PATTERN FIRST TO BYTE 0 THEN TO BYTE 1.
3313                                ;
3314                                ;*******************************************************************************
3315                                ;TEST 151       TEST MOV-BYTE DESTINATION MODE 2
3316                                ;*******************************************************************************
3317  010446                        TS151:
3318  010446  005000                        CLR     R0              ;R0=0
3319  010450  005010                        CLR     (R0)            ;LOC. 0=0
3320  010452  112720  000125        MBDM2A: MOVB    #125,(R0)+      ;TRY DESTINATION MODE 2 W/EVEN BYTE
3321  010456  102402                        BVS     MBDM2A          ;BR TO ERROR IF V SET
3322  010460  001401                        BEQ     MBDM2A          ;BR TO ERROR IF Z SET
3323  010462  100001                        BPL     MBDM2B
3324  010464                        MBDM2A:
3325  010464  104000                        EMT                     ;CC'S INCORRECT
3326  010466  022700  000001        MBDM2B: CMP     #1,R0
3327  010472  001401                        BEQ     MBDM2C
3328  010474  104000                        EMT                     ;REGISTER NOT INCREMENTED BY ONE
3329  010476  112720  000252        MBDM2C: MOVB    #252,(R0)+      ;TRY DESTINATION MODE 2 W/ODD BYTE
3330  010502  102402                        BVS     MBDM2D
3331  010504  001401                        BEQ     MBDM2D
3332  010506  100401                        BMI     MBDM2E
3333  010510                        MBDM2D:
3334  010510  104000                        EMT                     ;CC'S NOT SET CORRECT
3335  010512  022700  000002        MBDM2E: CMP     #2,R0
3336  010516  001401                        BEQ     MBDM2F
3337  010520  104000                        EMT                     ;REGISTER NOT INCREMENTED BY ONE
3338  010522  022737  125125  000000  MBDM2F: CMP     #125125,@#0     ;CHECK DATA
3339  010530  001401                        BEQ     TS152
3340  010532  104000                        EMT                     ;DESTINATION DATA INCORRECT
3341
3342                                ;*******************************************************************************
3343                                ;
3344                                ;       THIS TEST VERIFIES MOV DESTINATION MODE 3. R0 IS USED TO PICK UP
3345                                ;AN ADDRESS AT LOC. 400. LOC 400 POINTS TO LOC. 0 THE EFFECTIVE DEST. ADDR.. ALSO, MOVB
3346                                ;INST. ARE USED W/ EVEN AND ODD BYTES TO CHECK MOV BYTES INST AND MODE 37 DESTINATIONS.
3347                                ;*******************************************************************************
3348                                ;TEST 152       TEST MOV(B) DESTINATION MODE 3
```

```
                                ;*****************************************************************************************
                                TS152:
010534                                  MOV     #400,R0         ;R0=400
010534  012700  000400                  CLR     (R0)            ;LOC. 400 POINTS TO LOC. 0
010540  005010                          CLR     @#0             ;LOC. 0=0
010542  005037  000000                  MOV     #125252,@(R0)+  ;TRY MOV DESTINATION MODE 2
010546  012730  125252                  BVS     MDM3A           ;BR TO ERROR IF V SET
010552  102402                          BEQ     MDM3A           ;BR TO ERROR IF Z SET
010554  001401                          BMI     MDM3B
010556  100401
010560                          MDM3A:
010560  104000                          EMT                     ;CC'S INCORRECT
010562  022700  000402          MDM3B:  CMP     #402,R0         ;CHECK DEST. MODE REGISTER
010566  001401                          BEQ     MDM3C
010570  104000                          EMT                     ;REGISTER NOT INCREMENTED BY 2
010572  022737  125252  000000  MDM3C:  CMP     #125252,@#0     ;CHECK DESTINATION DATA
010600  001401                          BEQ     MDM3D
010602  104000                          EMT                     ;DESTINATION DATA INCORRECT
010604  112737  000125  000000  MDM3D:  MOVB    #125,@#0        ;TRY MOVB DESTINATION MODE 2 EVEN BYTE
010612  022737  125125  000000          CMP     #125125,@#0     ;CHECK DATA
010620  001401                          BEQ     MDM3E
010622  104000                          EMT                     ;DESTINATION DATA INCORRECT
010624  112737  000525  000001  MDM3E:  MOVB    #525,@#1        ;TRY MOVB DESTINATION MODE 2 ODD BYTE
010632  022737  052525  000000          CMP     #52525,@#0      ;CHECK DATA
010640  001401                          BEQ     TS153
010642  104000                          EMT                     ;
                                ;*****************************************************************************************
                                ;
                                ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 4 INSTRUCTION.
                                ;SOP INSTRUCTIONS ON R0 ARE USED TO CLEAR TARGET LOCATION 0.
                                ;R4 IS USED AS THE MODE 4 ADDRESSING REGISTER, AND
                                ;CONDITIONAL BRANCHES ARE USED TO VERIFY THE DATA.
                                ;
                                ;*****************************************************************************************
                                ;TEST 153       TEST MOV DESTINATION MODE 4
                                ;*****************************************************************************************
010644                          TS153:
010644  005000                          CLR     R0              ;R0=0
010646  005010                          CLR     (R0)            ;LOC 0=0
010650  012704  000002                  MOV     #2,R4           ;R4=2
010654  012744  012345                  MOV     #12345,-(R4)    ;TRY MOV DEST. MODE 4
010660  102402                          BVS     MDM4A           ;BR TO ERROR IF V-BIT SET
010662  001401                          BEQ     MDM4A           ;BR TO ERROR IF Z-BIT SET
010664  100001                          BPL     MDM4B
010666                          MDM4A:
010666  104000                          EMT                     ;CC'S NOT CORRECT
010670  005704                  MDM4B:  TST     R4              ;CHECK DECREMENTING OF MODE 4 REG.
010672  001401                          BEQ     MDM4C
010674  104000                          EMT                     ;DESTINATION MODE REGISTER NOT DECREMENTED BY 2
010676  022710  012345          MDM4C:  CMP     #12345,(R0)     ;CHECK DESTINATION DATA
010702  001401                          BEQ     TS154
010704  104000                          EMT                     ;DESTINATION DATA INCORRECT

                                ;*****************************************************************************************
                                ;
                                ;       THIS TEST VERIFIES THE MOVB DESTINATION MODE 4 INSTRUCTION
```

```
                        ;       ON BOTH ODD AND EVEN BYTES. SOP INSTRUCTIONS ON R4 ARE
                        ;       USED TO CLEAR TARGET LOCATION 0. R0 IS USED AS THE MODE 4
                        ;       ADDRESSING REGISTER, AND CMP AND CONDITIONAL BRANCH
                        ;       INSTRUCTIONS ARE USED TO VERIFY THE DATA.
                        ;
                        ;*****************************************************************************************
                        ;TEST 154       TEST MOVB DESTINATION MODE 4
                        ;*****************************************************************************************
010706                  TS154:
010706  005004                  CLR     R4              ;R4=0
010710  005014                  CLR     (R4)            ;LOC. 0=0
010712  012700  000002          MOV     #2,R0           ;R0 = 2
010716  112740  125125          MOVB    #125125,-(R0)   ;TRY MOVB DEST. MODE 4-ODD BYTE
010722  020027  000001          CMP     R0,#1           ;CHECK THAT DEST. REG. WAS DECREMENTED
010726  001401                  BEQ     MBDM4A
010730  104000                  EMT                     ;DESTINATION REG. NOT DECREMENTED BY 1
010732  021427  052400  MBDM4A: CMP     (R4),#52400     ;CHECK DEST. DATA
010736  001401                  BEQ     MBDM4B
010740  104000                  EMT                     ;DEST. DATA NOT CORRECT
010742  112740  125125  MBDM4B: MOVB    #125125,-(R0)   ;TRY MOVB DEST. MODE 4--EVEN BYTE
010746  102402                  BVS     MBDM4C          ;BR. TO ERROR IF V-BIT SET
010750  001401                  BEQ     MBDM4C          ;BR TO ERROR IF Z-BIT SET
010752  100001                  BPL     MBDM4D
010754                  MBDM4C:
010754  104000                  EMT                     ;COND. CODES INCORRECT
010756  005700  MBDM4D: TST     R0              ;CHECK MODE 4 DEST. REGISTER
010760  001401                  BEQ     MBDM4E
010762  104000                  EMT                     ;DESTINATION REG NOT DECREMENTED BY 1
010764  021427  052525  MBDM4E: CMP     (R4),#52525     ;CHECK DEST. DAT^A
010770  001401                  BEQ     TS155
010772  104000                  EMT                     ;DESTINATION DATA INCORRECT

                        ;*****************************************************************************************
                        ;
                        ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 5 AND THE MOVB
                        ;DESTINATION MODE 5 - EVEN BYTE INSTRUCTIONS. R4 IS A
                        ;POINTER TO TARGET LOCATION 0 AND R0 IS SETUP TO
                        ;POINT TO LOCATION 376 FOR THE MOV, AND LOCATION 404 FOR
                        ;THE MOVB INSTRUCTIONS. CMP INSTRUCTIONS ARE USED TO VERIFY
                        ;PROPER ADDRESSING AND DATA.
                        ;
                        ;*****************************************************************************************
                        ;TEST 155       TEST MOV DESTINATION MODE 5
                        ;*****************************************************************************************
010774                  TS155:
010774  005004                  CLR     R4              ;R4=0
010776  005014                  CLR     (R4)            ;LOC. 0 = 0
011000  012700  000400          MOV     #400,R0         ;R0=400
011004  012750  004321          MOV     #4321,@-(R0)    ;TRY MOV DEST. MODE 5
011010  102402                  BVS     MDM5A           ;BR TO ERROR IF V-BIT SET
011012  001401                  BEQ     MDM5A           ;BR TO ERROR IF Z-BIT SET
011014  100001                  BPL     MDM5B
011016                  MDM5A:
011016  104000                  EMT                     ;COND. CODES INCORRECT
011020  022700  000376  MDM5B:  CMP     #376,R0         ;CHECK MODE 5 REG. WAS DECREMENTED
011024  001401                  BEQ     MDM5C
```

```
3461  011026  104000                          EMT                     ;MODE 5 REGISTER NOT DECREMENTED BY 2
3462  011030  022714  004321        MDM5C:   CMP     #4321,(R4)      ;CHECK DEST. DATA
3463  011034  001401                          BEQ     MDM5D
3464  011036  104000                          EMT                     ;DEST. DATA INCORRECT
3465  011040  012700  000406        MDM5D:   MOV     #406,R0         ;R0=406
3466  011044  112750  000377                 MOVB    #377,@-(R0)     ;TRY MOV DEST. MODE 5 --EVEN BYTE
3467  011050  022700  000404                 CMP     #404,R0         ;CHECK MODE 5 REG.
3468  011054  001401                          BEQ     MDM5E
3469  011056  104000                          EMT                     ;MODE 5 REGISTER NOT DECREMENTED BY 2
3470  011060  022714  177721        MDM5E:   CMP     #177721,(R4)    ;CHECK DEST. DATA
3471  011064  001401                          BEQ     TS156
3472  011066  104000                          EMT                     ;DEST. DATA INCORRECT
3473
3474                                ;*****************************************************************************
3475                                ;
3476                                ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 6 AND MOVB - EVEN BYTE
3477                                ;DESTINATION MODE 6 INDTRUCTIONS. R0 IS USED TO SETUP TARGET LOC.0
3478                                ;FOR BOTH TESTS. PATTERNS OF ONES AND ZEROES ARE MOVED INTO LOC.0
3479                                ;BY MODE 6 INSTRUCTIONS, AND CMP INSTRUCTIONS ARE USED TO VERIFY
3480                                ;PROPER ADDRESSING AND DATA.
3481                                ;
3482                                ;*****************************************************************************
3483                                ;TEST 156       TEST MOV DESTINATION MODE 6
3484                                ;*****************************************************************************
3485  011070                        TS156:
3486  011070  005000                          CLR     R0              ;R0=0
3487  011072  005010                          CLR     (R0)            ;LOC. 0=0
3488  011074  005200                          INC     R0              ;R0=1
3489  011076  012760  052525  177777         MOV     #052525,-1(R0)  ;TRY MOV DEST. MODE 6
3490  011104  102402                          BVS     MDM6A           ;BR TO ERROR IF V-BIT SET
3491  011106  001401                          BEQ     MDM6A           ;BR TO ERROR IF Z-BIT SET
3492  011110  100001                          BPL     MDM6B
3493  011112                        MDM6A:
3494  011112  104000                          EMT                     ;COND. CODES INCORRECT
3495  011114  022700  000001        MDM6B:   CMP     #1,R0           ;CHECK DEST. REGISTER UNALTERED
3496  011120  001401                          BEQ     MDM6C
3497  011122  104000                          EMT                     ;DEST. REGISTER INCORRECTLY ALTERED
3498  011124  022737  052525  000000 MDM6C:   CMP     #52525,@#0      ;CHECK DEST. DATA
3499  011132  001401                          BEQ     MDM6D
3500  011134  104000                          EMT                     ;DEST. DATA INCORRECT
3501  011136  012700  000002        MDM6D:   MOV     #2,R0           ;R0=2
3502  011142  112760  000377  177777         MOVB    #377,-1(R0)     ;TRY MOVB DEST. MODE 6
3503  011150  022700  000002                 CMP     #2,R0           ;CHECK DEST. REGISTER UNALTERED
3504  011154  001401                          BEQ     MDM6E
3505  011156  104000                          EMT                     ;DEST. REGISTER INCORRECTLY ALTERED
3506  011160  022737  177525  000000 MDM6E:   CMP     #177525,@#0     ;CHECK DEST. DATA
3507  011166  001401                          BEQ     TS157
3508  011170  104000                          EMT                     ;DEST. DATA INCORRECT
3509
3510                                ;*****************************************************************************
3511                                ;
3512                                ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 7 AND MOVB - ODD BYTE
3513                                ;DESTINATION MODE 7 INSTRUCTIONS. R4 POINTS TO TARGET LOC.0 AND R0
3514                                ;IS USED AS THE MODE 7 ADDRESSING REGISTER. CMP INSTRUCTIONS ARE
3515                                ;USED TO VERIFY PROPER ADDRESSING AND DATA.
3516                                ;
```

```
                                ;*****************************************************************************************
                                ;TEST 157       TEST MOV DESTINATION MODE 7
                                ;*****************************************************************************************
011172                          TS157:
011172  005004                          CLR     R4                      ;R4=0
011174  005014                          CLR     (R4)                    ;LOC.0=0
011176  012700  000403                  MOV     #403,R0                 ;R0=403
011202  012770  070707  177777          MOV     #70707,@-1(R0)          ;TRY MOV W/DEST MODE 7
011210  102402                          BVS     MDM7A                   ;BR. TO ERROR IF V-BIT SET
011212  001401                          BEQ     MDM7A                   ;BR TO ERROR IF Z-BIT SET
011214  100001                          BPL     MDM7B
011216                          MDM7A:
011216  104000                          EMT                             ;COND. CODES INCORRECT
011220  022700  000403          MDM7B:  CMP     #403,R0                 ;CHECK DEST. REGISTER
011224  001401                          BEQ     MDM7C
011226  104000                          EMT                             ;DEST. REGISTER INCORRECTLY ALTERED
011230  022737  070707  000000  MDM7C:  CMP     #70707,@#0              ;CHECK DEST. DATA
011236  001401                          BEQ     MDM7D
011240  104000                          EMT                             ;DEST. DATA INCORRECT
011242  112770  107070  000001  MDM7D:  MOVB    #107070,@1(R0)          ;TRY MOVB W/DEST MODE 7--ODD BYTE
011250  022700  000403                  CMP     #403,R0                 ;CHECK MODE 7 DEST. REG.
011254  001401                          BEQ     MDM7E
011256  104000                          EMT                             ;DEST. DATA INCORRECT
011260  022737  034307  000000  MDM7E:  CMP     #34307,@#0              ;CHECK DEST. DATA
011266  001401                          BEQ     TS160
011270  104000                          EMT                             ;DESTINATION DATA INCORRECT

                                ;*****************************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 4 DOUBLE OPERAND INSTRUCTIONS.
                                ;THE TEST USES MODE 4 ADDRESSING WITH REGISTER 0 TO MOVE THRU A
                                ;TABLE OF OPERANDS.  THE TABLE OF OPERANDS AND THE WORK LOCATION IS
                                ;STORED FOLLOWING THE TEST CODE.  A SERIES OF 5 DOP INSTRUCTIONS UTILIZES
                                ;THE DATA IN THE TABLE TO CYCLE THE WORK LOCATION THRU A SET OF
                                ;VALUE.  THE DATA HAS BEEN CHOSEN TO INSURE THAT NO SINGLE ERROR WILL
                                ;GO UNDETECTED.  WORD AND BYTE INSTRUCTION ACCESSING BOTH EVEN AND
                                ;ODD ADDRESSES ARE USED IN THE TEST.  THE LISTING SHOWS THE
                                ;EXPECTED INTERMEDIATE RESULT AS EACH INSTRUCTION IS EXECUTED.
                                ;
                                ;*****************************************************************************************
                                ;TEST 160       TEST MODE 4 W/ DOP INSTS.
                                ;*****************************************************************************************
011272                          TS160:
011272  012700  011336                  MOV     #TBL1,R0                ;INITIALIZE R0
011276  014037  011336                  MOV     -(R0),@#TBL1            ;TBL1=125252
011302  064037  011336                  ADD     -(R0),@#TBL1            ;TBL1=000377
011306  144037  011336                  BICB    -(R0),@#TBL1            ;TBL1=000252
011312  154037  011337                  BISB    -(R0),@#TBL1+1          ;TBL1=125252
011316  024037  011336                  CMP     -(R0),@#TBL1            ;CHECK RESULT
011322  001406                          BEQ     TS161
011324                          DOP4:
011324  104000                          EMT                             ;RESULT OF MODE 4 INSTS. INCORRECT

011326  125252                          125252
011330  052652                          52652
011332  053125                          53125
```

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3573  011334  125252                    125252
3574  011336  000000            TBL1:   0
3575
3576                            ;*****************************************************************************
3577                            ;
3578                            ;       THIS TEST VERIFIES MODE 5 DOUBLE OPERAND INSTRUCTIONS.
3579                            ;THE TEST USES AN ADDRESS TABLE STORED FOLLOWING THE TEST CODE.
3580                            ;THIS TABLE IS SIMPLY A TABLE OF ADDRESS POINTERS WHICH ADDRESS
3581                            ;THE DATA TABLE USED IN THE PREVIOUS TEST.  THE TEST IS IDENTICAL TO
3582                            ;THE PREVIOUS TEST EXCEPT THE DATA IS REFERENCED USING THIS ADDRESS
3583                            ;TABLE AND MODE 5 ADDRESSING.  (SEE PREVIOUS TEST).
3584                            ;
3585                            ;*****************************************************************************
3586                            ;TEST 161       TEST MODE 5 W/ DOP INSTS.
3587                            ;*****************************************************************************
3588  011340                    TS161:
3589  011340  012700  011406           MOV     #TBL2+2,R0      ;INITIALIZE R0
3590  011344  015037  011336           MOV     @-(R0),@#TBL1   ;TBL1=125252
3591  011350  065037  011336           ADD     @-(R0),@#TBL1   ;TBL1=000377
3592  011354  145037  011336           BICB    @-(R0),@#TBL1   ;TBL1=000252
3593  011360  155037  011337           BISB    @-(R0),@#TBL1+1 ;TBL1=125252
3594  011364  025037  011336           CMP     @-(R0),@#TBL1   ;CHECK RESULT
3595  011370  001406                   BEQ     TS162
3596  011372                    DOP5:
3597  011372  104000                   EMT                     ;RESULT OF MODE 5 INSTS. INCORRECT
3598  011374  011326                   TBL1-10
3599  011376  011330                   TBL1-6
3600  011400  011331                   TBL1-5
3601  011402  011332                   TBL1-4
3602  011404  011334            TBL2:   TBL1-2
3603                            ;*****************************************************************************
3604                            ;
3605                            ;       THIS TEST VERIFIES MODE 6 DOUBLE OPERAND INSTRUCTIONS.
3606                            ;IT USES THE SAME DATA AS THAT USED IN THE MODE 4 TESTS.
3607                            ;THIS TIME THE DATA IS ACCESSED USING MODE 6.  R0 IS SET
3608                            ;TO POINT TO THE MIDDLE OF THE TABLE.  THE TABLE IS ACCESSED FROM
3609                            ;BOTTOM TO TOP BY VARYING THE OFFSET IN THE MODE 6 INSTRUCTIONS.
3610                            ;THE DATA RESULTS ARE IDENTICAL TO THOSE EXPECTED IN THE MODE 4
3611                            ;TESTS.
3612                            ;
3613                            ;*****************************************************************************
3614                            ;TEST 162       TEST MODE 6 W/ DOP INSTS.
3615                            ;*****************************************************************************
3616  011406                    TS162:
3617  011406  012700  011332           MOV     #TBL1-4,R0      ;INITIALIZE R0
3618  011412  016037  000002  011336   MOV     2(R0),@#TBL1    ;TBL1=125252
3619  011420  066037  000000  011336   ADD     0(R0),@#TBL1    ;TBL1=000377
3620  011426  146037  177777  011336   BICB    -1(R0),@#TBL1   ;TBL1=000252
3621  011434  156037  177776  011337   BISB    -2(R0),@#TBL1+1 ;TBL1=125252
3622  011442  026037  177774  011336   CMP     -4(R0),@#TBL1   ;CHECK RESULT
3623  011450  001401                   BEQ     TS163
3624  011452  104000                   EMT                     ;RESULT OF MODE 6 INSTS. INCORRECT
3625                            ;*****************************************************************************
3626                            ;
3627                            ;       THIS TEST VERIFIES MODE 7 DOUBLE OPERAND INSTRUCTIONS.
3628                            ;THIS TEST USES THE SAME ADDRESS TABLE AND DATA TABLE USED BY
```

```
                                ;THE MODE 5 TESTS.  THIS TIME THE DATA IS ACCESSED USING MODE 7.
                                ;R0 IS SET TO POINT TO THE MIDDLE OF THE ADDRESS TABLE IN THE MODE 5
                                ;TEST.  THE TABLE IS ACCESSED FROM BOTTOM TO TOP BY VARYING THE OFFSET
                                ;IN THE MODE 7 INSTRUCTIONS.  THE DATA RESULTS ARE IDENTICAL TO
                                ;THOSE EXPECTED IN THE MODE 5 TESTS.
                                ;
                                ;*****************************************************************************
                                ;TEST 163       TEST MODE 7 W/ DOP INSTS.
                                ;*****************************************************************************
011454                          TS163:
011454  012700  011400                  MOV     #TBL2-4,R0      ;INITIALIZE R0
011460  017037  000004  011336          MOV     @4(R0),@#TBL1   ;TBL1=125252
011466  067037  000002  011336          ADD     @2(R0),@#TBL1   ;TBL1=000377
011474  147037  000000  011336          BICB    @0(R0),@#TBL1   ;TBL1=000252
011502  157037  177776  011337          BISB    @-2(R0),@#TBL1+1                ;TBL1=125252
011510  027037  177774  011336          CMP     @-4(R0),@#TBL1          ;CHECK RESULT
011516  001401                          BEQ     TS164
011520  104000                          EMT                             ;RESULT OF MODE 7 INSTS INCORRECT
                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES THE ROTATE MODE 0 INSTRUCTIONS.
                                ;R0 IS LOADED WITH A DATA PATTERN, THE C-BIT IS LOADED, AND
                                ;AN ROL INSTRUCTION IS EXECUTED WITH MODE 0.  THE OPERATION IS CHECKED
                                ;BY TESTING THE RESULTING DATA AND THE STATE OF THE C AND V BITS.
                                ;NEXT, THE SAME PROCEDURE IS EXECUTED TO TEST MODE 0 BYTE INSTRUCTIONS.
                                ;
                                ;*****************************************************************************
                                ;TEST 164       TEST ROTATE INSTRUCTIONS OF MODE 0
                                ;*****************************************************************************
011522                          TS164:
011522  012700  125252                  MOV     #125252,R0      ;INITIALIZE DATA
011526  000261                          SEC                     ;SET C-BIT
011530  006100                          ROL     R0              ;TRY ROL W/ MODE 0
011532  102004                          BVC     ROT0A           ;CC=0011
011534  103003                          BCC     ROT0A
011536  022700  052525                  CMP     #052525,R0      ;CHECK DATA
011542  001401                          BEQ     ROT0B
011544                          ROT0A:
011544  104000                          EMT                     ;ROL MODE 0 FAILED
011546  012700  125252          ROT0B:  MOV     #125252,R0      ;INITIALIZE DATA
011552  000261                          SEC                     ;SET C-BIT
011554  106100                          ROLB    R0              ;TRY ROL W/ MODE 0 EVEN BYTE
011556  102004                          BVC     ROT0C           ;CC=0011
011560  103003                          BCC     ROT0C
011562  022700  125125                  CMP     #125125,R0      ;CHECK DATA
011566  001401                          BEQ     TS165
011570                          ROT0C:
011570  104000                          EMT                     ;ROLB MODE 0 FAILED

                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES THE ROTATE MODE 1 INSTRUCTIONS.
                                ;THE DATA TO BE ROTATED IS IN LOC 0.  R0 IS USED AS THE
                                ;ADDRESSING REGISTER.  THE C-BIT IS LOADED AND AN ROL IS EXECUTED.
                                ;THE RESULTS ARE CHECKED BY COMPARING THE DATA RESULTS AND TESTING
                                ;THE C AND V BITS.  THIS PROCEDURE IS THEN REPEATED TWICE MORE
```

```
3685                                    ;TO TEST THE BYTE ROTATES.  FIRST ON BYTE 0, THEN ON BYTE 1.
3686                                    ;
3687                                    ;*****************************************************************************
3688                                    ;TEST 165       TEST ROTATE INSTRUCTIONS W/ MODE 1
3689                                    ;*****************************************************************************
3690  011572                            TS165:
3691  011572  005000                           CLR     R0              ;POINT TO LOC. 0
3692  011574  012710  052525                  MOV     #52525,(R0)     ;INITIALIZE DATA
3693  011600  000241                           CLC                     ;CLEAR C-BIT
3694  011602  006110                           ROL     (R0)            ;TRY ROL W/ MODE 1
3695  011604  102005                           BVC     ROT1A           ;CC=1010
3696  011606  103404                           BCS     ROT1A
3697  011610  023727  000000  125252           CMP     @#0,#125252     ;CHECK RESULT
3698  011616  001401                           BEQ     ROT1B
3699  011620                            ROT1A:
3700  011620  104000                           EMT                     ;ROL MODE 1 FAILED
3701  011622  000261                    ROT1B: SEC
3702  011624  012710  125252                  MOV     #125252,(R0)    ;INITIALIZE DATA
3703  011630  106110                           ROLB    (R0)            ;TRY ROLB W/ MODE 1 EVEN BYTE
3704  011632  102005                           BVC     ROT1C           ;CC=1011
3705  011634  103004                           BCC     ROT1C
3706  011636  022737  125125  000000           CMP     #125125,@#0     ;TEST RESULT
3707  011644  001401                           BEQ     ROT1D
3708  011646                            ROT1C:
3709  011646  104000                           EMT                     ;ROLB W/ MODE 1 EVEN BYTE FAILED
3710  011650  012710  125252            ROT1D: MOV     #125252,(R0)
3711  011654  005000                           CLR     R0              ;POINT TO ODD BYTE
3712  011656  005200                           INC     R0
3713  011660  000261                           SEC                     ;SET C-BIT
3714  011662  106110                           ROLB    (R0)            ;TRY ROLB W/ MODE 1 ODD BYTE
3715  011664  102005                           BVC     ROT1E           ;CC=0011
3716  011666  103004                           BCC     ROT1E
3717  011670  022737  052652  000000           CMP     #052652,@#0     ;CHECK DATA
3718  011676  001401                           BEQ     TS166
3719  011700                            ROT1E:
3720  011700  104000                           EMT                     ;ROLB W/ MODE 1 ODD BYTE FAILED
3721
3722                                    ;*****************************************************************************
3723                                    ;
3724                                    ;       THIS TEST VERIFIES MODE 2 ROTATE INSTRUCTIONS.
3725                                    ;THE SAME PROCEDURE AS IN THE OTHER ROTATE TESTS ARE USED.  R0
3726                                    ;IS USED AS THE ADDRESSING REGISTER AND IS CHECKED FOR PROPER
3727                                    ;INCREMENTING.  BYTE INSTRUCTIONS ARE ALSO CHECKED.
3728                                    ;
3729                                    ;*****************************************************************************
3730                                    ;TEST 166       TEST ROTATE INSTRUCTIONS W/ MODE 2
3731                                    ;*****************************************************************************
3732  011702                            TS166:
3733  011702  005000                           CLR     R0              ;POINT TO LOC 0
3734  011704  012710  173737                  MOV     #173737,(R0)    ;INITIALIZE DATA
3735  011710  000241                           CLC                     ;CLEAR C-BIT
3736  011712  006120                           ROL     (R0)+           ;TRY ROL W/ MODE 2
3737  011714  103007                           BCC     ROT2A           ;CHECK C-BIT
3738  011716  022737  167676  000000           CMP     #167676,@#0     ;CHECK DATA
3739  011724  001003                           BNE     ROT2A           ;BRANCH IF RESULT INCORRECT
3740  011726  005300                           DEC     R0              ;TEST R0
```

```
3741  011730  005300                          DEC     R0
3742  011732  001401                          BEQ     ROT2B
3743  011734                          ROT2A:
3744  011734  104000                          EMT                     ;ROL W/ MODE 2 FAILED
3745  011736  005000                  ROT2B:  CLR     R0              ;POINT TO LOC 0
3746  011740  012710  004040                  MOV     #4040,(R0)      ;INITIALIZE DATA
3747  011744  000241                          CLC                     ;CLEAR C-BIT
3748  011746  106120                          ROLB    (R0)+           ;TRY ROLB W/ MODE 2 EVEN BYTE
3749  011750  103406                          BCS     ROT2C           ;CHECK C-BIT
3750  011752  022737  004100  000000          CMP     #4100,@#0       ;CHECK DATA
3751  011760  001002                          BNE     ROT2C           ;BRANCH IF DATA INCORRECT
3752  011762  005300                          DEC     R0              ;CHECK R0
3753  011764  001401                          BEQ     ROT2D
3754  011766                          ROT2C:
3755  011766  104000                          EMT                     ;ROLB W/ MODE 2 EVEN BYTE FAILED
3756  011770  005000                  ROT2D:  CLR     R0              ;POINT TO LOC 0
3757  011772  012710  004040                  MOV     #4040,(R0)      ;INITIALIZE DATA
3758  011776  005200                          INC     R0              ;POINT TO ODD BYTE OF DATA
3759  012000  000261                          SEC                     ;SET C-BIT
3760  012002  106120                          ROLB    (R0)+           ;TRY ROL W/ MODE 2 ODD BYTE
3761  012004  103407                          BCS     ROT2E           ;CHECK C-BIT
3762  012006  022737  010440  000000          CMP     #10440,@#0      ;CHECK DATA
3763  012014  001003                          BNE     ROT2E           ;BRANCH IF DATA INCORRECT
3764  012016  005300                          DEC     R0              ;CHECK R0
3765  012020  005300                          DEC     R0
3766  012022  001401                          BEQ     TS167
3767  012024                          ROT2E:
3768  012024  104000                          EMT                     ;ROLB W/ MODE 2 ODD BYTE FAILED
3769
3770                                  ;*****************************************************************************
3771                                  ;
3772                                  ;       THIS TEST VERIFIES MODE 3 ROTATE INSTRUCTIONS.
3773                                  ;THIS TEST USES THE SAME PROCEDURES AS IN THE OTHER ROTATE
3774                                  ;TESTS.  THE DATA IS STORED IN LOC. 0 AND IS ADDRESSED USING
3775                                  ;MODE 37.  BYTE ADDRESSING IS ALSO CHECKED FOR EVEN AND ODD BYTES.
3776                                  ;
3777                                  ;*****************************************************************************
3778                                  ;TEST 167       TEST ROTATE INSTRUCTIONS /W MODE 3
3779                                  ;*****************************************************************************
3780  012026                          TS167:
3781  012026  012737  052525  000000          MOV     #52525,@#0      ;INITIALIZE DATA IN LOC 0
3782  012034  000261                          SEC                     ;SET C-BIT
3783  012036  006137  000000                  ROL     @#0             ;TRO ROL W/ MODE 3
3784  012042  103404                          BCS     ROT3A           ;CHECK C-BIT
3785  012044  022737  125253  000000          CMP     #125253,@#0     ;CHECK DATA
3786  012052  001401                          BEQ     ROT3B
3787  012054                          ROT3A:
3788  012054  104000                          EMT                     ;ROL W/ MODE 3 FAILED
3789  012056  012737  125252  000000  ROT3B:  MOV     #125252,@#0     ;INITIALIZE DATA
3790  012064  000241                          CLC                     ;CLEAR C-BIT
3791  012066  106137  000000                  ROLB    @#0             ;TRY ROL W/ MODE 3 EVEN BYTE
3792  012072  103004                          BCC     ROT3C           ;CHECK C-BIT
3793  012074  023727  000000  125124  4$:     CMP     @#0,#125124     ;CHECK DATA
3794  012102  001401                          BEQ     ROT3D
3795  012104                          ROT3C:
3796  012104  104000                          EMT                     ;ROL W/ MODE 3 EVEN BYTE FAILED
```

```
3797  012106  012737  125252  000000  ROT3D:  MOV     #125252,@#0     ;INITIALIZE DATA IN LOC. 0
3798  012114  000261                          SEC                     ;SET C-BIT
3799  012116  106137  000001                  ROLB    @#1             ;TRY ROL W/ MODE 3 ODD BYTE
3800  012122  103004                          BCC     ROT3E           ;CHECK C-BIT
3801  012124  022737  052652  000000          CMP     #052652,@#0     ;CHECK DATA
3802  012132  001401                          BEQ     TS170
3803  012134                          ROT3E:
3804  012134  104000                          EMT                     ;ROL W/ MODE 3 ODD BYTE FAILED
3805
3806                                  ;*****************************************************************************
3807                                  ;
3808                                  ;       THIS TEST VERIFIES MODE 4 ROTATE INSTRUCTIONS.  THE DATA IS
3809                                  ;STORED IN LOC. 0.  R0 IS SET TO 2 AND THE CARRY IS SET.  AN ROL MODE 4
3810                                  ;IS USED TO ROTATE LOCATION 0 USING R0.  THE DATA IS CHECKED
3811                                  ;AND THE C AND V BITS ARE TESTED.  THE PROPER DECREMENTING OF
3812                                  ;R0 IS VERIFIED.
3813                                  ;
3814                                  ;*****************************************************************************
3815                                  ;TEST 170       TEST MODE 4 W/ ROTATE INSTRUCTIONS
3816                                  ;*****************************************************************************
3817  012136                          TS170:
3818  012136  012737  070707  000000          MOV     #070707,@#0     ;INITIALIZE DATA IN LOC. 0
3819  012144  012700  000002                  MOV     #2,R0           ;INITIALIZE R0 AS POINTER
3820  012150  000261                          SEC                     ;SET C-BIT
3821  012152  006140                          ROL     -(R0)           ;TRY ROL W/ MODE 4
3822  012154  103406                          BCS     ROT4            ;CHECK C-BIT
3823  012156  022737  161617  000000          CMP     #161617,@#0     ;CHECK DATA
3824  012164  001002                          BNE     ROT4            ;BRANCH IF DATA INCORRECT
3825  012166  005700                          TST     R0              ;CHECK MODE 4 REGISTER
3826  012170  001401                          BEQ     TS171
3827  012172                          ROT4:
3828  012172  104000                          EMT                     ;ROL MODE 4 FAILED
3829
3830                                  ;*****************************************************************************
3831                                  ;
3832                                  ;       THIS TEST VERIFIES MODE 5 ROTATE INSTRUCTIONS.
3833                                  ;THE DATA IS STORED IN A WORK LOCATION (ROTX) AT THE END OF THE
3834                                  ;TEST CODE.  LOC. 0 IS LOADED WITH THE ADDRESS OF THE DATA (ROTX).
3835                                  ;R0 IS SET TO 2.  THE CARRY IS CLEARED AND A MODE 5 ROL
3836                                  ;IS EXECUTED USING R0 AS AN ADDRESSING REGISTER.  THE DATA IS
3837                                  ;CHECKED, THE C AND V BITS TESTED, AND R0 CHECKED FOR PROPER
3838                                  ;DECREMENTING.
3839                                  ;
3840                                  ;*****************************************************************************
3841                                  ;TEST 171       TEST MODE 5 W/ ROTATE INSTRUCTIONS
3842                                  ;*****************************************************************************
3843  012174                          TS171:
3844  012174  012737  012240  000000          MOV     #ROTX,@#0       ;MOVE POINTER TO LOC. 0
3845  012202  012700  000002                  MOV     #2,R0           ;SET MODE 5 REG. TO LOC. 0
3846  012206  012767  107070  000024          MOV     #107070,ROTX    ;INITIALIZE DATA
3847  012214  000241                          CLC                     ;CLEAR C-BIT
3848  012216  006150                          ROL     @-(R0)          ;TRY ROL W/ MODE 5
3849  012220  103006                          BCC     ROT5            ;CHECK C-BIT
3850  012222  022737  016160  012240          CMP     #016160,@#ROTX  ;CHECK DATA
3851  012230  001002                          BNE     ROT5            ;BRANCH IF DATA INCORRECT
3852  012232  005700                          TST     R0              ;CHECK MODE 5 REGISTER
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```
3853  012234  001402                        BEQ     TS172
3854  012236                        ROT5:
3855  012236  104000                        EMT                     ;ROL MODE 5 FAILED
3856  012240  000000                ROTX:   0
3857
3858                                ;*****************************************************************************
3859                                ;
3860                                ;       THIS TEST VERIFIES MODE 6 ROTATE INSTRUCTIONS.
3861                                ;IT USES THE SAME PROCEDURE AS THE ABOVE TEST EXCEPT THE
3862                                ;ROTATE INSTRUCTION USES MODE 6 ADDRESSING WITH REGISTER 7.
3863                                ;THE DATA IS STILL OPERATED ON IN LOC. ROTX (SEE PREVIOUS TEST).
3864                                ;
3865                                ;*****************************************************************************
3866                                ;TEST 172       TEST MODE 6 W/ ROTATE INSTRUCTIONS
3867                                ;*****************************************************************************
3868  012242                        TS172:
3869  012242  012737  125252  012240        MOV     #125252,@#ROTX  ;INITIALIZE DATA
3870  012250  000261                        SEC                     ;SET C-BIT
3871  012252  006167  177762                ROL     ROTX            ;TRY ROL W/ MODE 6
3872  012256  103004                        BCC     ROT6            ;CHECK C-BIT
3873  012260  022737  052525  012240        CMP     #52525,@#ROTX   ;CHECK DATA
3874  012266  001401                        BEQ     TS173
3875  012270                        ROT6:
3876  012270  104000                        EMT                     ;ROL W/ MODE 6 FAILED
3877
3878                                ;*****************************************************************************
3879                                ;
3880                                ;THIS TEST VERIFIES MODE 7 ROTATE INSTRUCTIONS.
```

```
                                ;THE DATA IS SET IN LOC. ROTX, (SEE PREVIOUS TEST).  THE ROL INSTRUCTION
                                ;ADDRESSES IT INDIRECTLY USING MODE 7 AND INDIRECT ADDRESS LOCATION
                                ;(ROTXAD) FOLLOWING THE TEST CODE.
                                ;
                                ;*****************************************************************************
                                ;TEST 173        TEST MODE 7 W/ ROTATE INSTRUCTIONS
                                ;*****************************************************************************
012272                          TS173:
012272  012737  052525  012240          MOV     #52525,@#ROTX   ;INITIALIZE DATA
012300  012737  012240  012330          MOV     #ROTX,@#ROTXAD  ;INITIALIZE ADDRESS POINTER
012306  000241                        CLC                     ;CLEAR C-BIT
012310  006177  000014                ROL     @ROTXAD         ;TRY ROL W/ MODE 7
012314  103404                        BCS     ROT7            ;CHECK C-BIT
012316  023727  012240  125252        CMP     @#ROTX,#125252  ;CHECK DATA
012324  001402                        BEQ     TS174
012326                          ROT7:
012326  104000                        EMT                     ;ROL W/ MODE 7 FAILED
012330  000000                  ROTXAD: 0
                                ;
                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 0 SWAB INSTRUCTION.  R0 IS SET TO
                                ;177400.  A SWAB MODE 0 IS EXECUTED AND THE CONDITIONAL BRANCH
                                ;IS USED TO CHECK THE SIGN OF THE RESULT.  ALSO, A COMPARISON
                                ;IS MADE TO CHECK THE DATA RESULTS.
                                ;
                                ;*****************************************************************************
                                ;TEST 174        TEST MODE 0 W/ SWAB INST.
                                ;*****************************************************************************
012332                          TS174:
012332  012700  177400                MOV     #177400,R0      ;MOVE TEST PATTERN TO R0
012336  000300                        SWAB    R0              ;TRY SWAB MODE 0
012340  100401                        BMI     SB0
012342  104000                        EMT                     ;SWAB DID NOT SET CC'S CORRECT
012344  022700  000377          SB0:  CMP     #377,R0         ;CHECK RESULT
012350  001401                        BEQ     TS175
012352  104000                        EMT                     ;RESULT OF SWAB MODE 0 FAILED
                                ;
                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 1 SWAB INSTRUCTION.  THE TEST
                                ;PATTERN IS MOVED TO LOC 0.  R0 IS CLEARED AND USED AS THE ADDRESSING
                                ;REGISTER IN THE MODE 1 SWAB.  THE DATA RESULTS ARE CHECKED WITH
                                ;A COMPARE.
                                ;
                                ;*****************************************************************************
                                ;TEST 175        TEST MODE 1 W/ SWAB INST
                                ;*****************************************************************************
012354                          TS175:
012354  012737  125652  000000        MOV     #125652,@#0     ;MOVE TEST PATTERN TO LOC. 0
012362  005000                        CLR     R0              ;R0=0
012364  000310                        SWAB    (R0)            ;TRY SWAB MODE 1
012366  022737  125253  000000        CMP     #125253,@#0     ;CHECK RESULT
012374  001401                        BEQ     TS176
012376  104000                        EMT                     ;RESULT OF SWAB MODE 1 FAILED
```

```
                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 2 SWAB INSTRUCTION.  THE TEST
                                ;PATTERN IS MOVED TO LOC 0.  R0 IS CLEARED AND USED AS THE MODE
                                ;2 ADDRESSING REGISTER.  THE RESULTS ARE CHECKED WITH A COMPARE.
                                ;R0 IS CHECKED FOR PROPER DECREMENTING.
                                ;
                                ;*****************************************************************************
                                ;TEST 176        TEST MODE 2 W/ SWAB INST
                                ;*****************************************************************************
012400                          TS176:
012400  012737  125152  000000          MOV     #125152,@#0     ;MOVE TEST PATTERN TO LOC. 0
012406  005000                        CLR     R0              ;R0=0
012410  000320                        SWAB    (R0)+           ;TRY SWAB MODE 2
012412  022737  065252  000000        CMP     #65252,@#0      ;CHECK RESULT
012420  001401                        BEQ     SB2
012422  104000                        EMT                     ;RESULT OF SWAB MODE 0 FAILED
012424  162700  000002          SB2:  SUB     #2,R0           ;CHECK EFFECT OF REG.
012430  001401                        BEQ     TS177
012432  104000                        EMT                     ;REGISTER VALUE INCORRECT


                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 3 SWAB INSTRUCTION.  THE TEST
                                ;PATTERN IS MOVED TO LOC 0.  A MODE 3 SWAB INSTRUCTION IS EXECUTED
                                ;USING R7 AS THE ADDRESSING REGISTER.  A COMPARE VERIFIES THE
                                ;DATA RESULTS.
                                ;
                                ;*****************************************************************************
                                ;TEST 177        TEST MODE 3 W/SWAB INST.
                                ;*****************************************************************************
012434                          TS177:
012434  012737  000377  00000          MOV     #377,@#0        ;MOVE TEST PATTERN TO LOC. 0
012442  000337  000000                SWAB    @#0             ;TRY SWAB W/ MODE 3
012446  022737  177400  000000        CMP     #177400,@#0     ;CHECK RESULT
012454  001401                        BEQ     TS200
012456  104000                        EMT                     ;RESULT OF SWAB INCORRECT


                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 4 SWAB INSTRUCTIONS.  THE DATA
                                ;IS MOVED TO LOC 0.  R0 IS SET TO 2 AND USED AS THE MODE 4 ADDRESSING
                                ;REGISTER.  THE DATA IS CHECKED WITH A COMPARE AND R0 IS CHECKED
                                ;FOR PROPER DECREMENTING.
                                ;
                                ;*****************************************************************************
                                ;TEST 200        TEST MODE 4 W/ SWAB INST
                                ;*****************************************************************************
012460                          TS200:
012460  012737  125652  000000          MOV     #125652,@#0     ;MOVE TEST PATTERN TO LOC. 0
012466  012700  000002                MOV     #2,R0           ;SET UP REGISTER POINTER
012472  000340                        SWAB    -(R0)           ;TRY SWAB MODE 4
```

```
                                        CMP     #125253,@#0     ;CHECK RESULT
                                        BEQ     SB4
                                        EMT                     ;RESULT OF SWAB INCORRECT
                                SB4:    TST     R0              ;CHECK EFFECT ON REG.
                                        BEQ     TS201
                                        EMT                     ;REGISTER VALUE INCORRECT

                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 5 SWAB INSTRUCTION.  THE TEST USES
                                ;TWO LOCATIONS FOLLOWING THE TEST CODE.  SB5X HOLDS THE DATA;
                                ;SB5XAD IS A POINTER TO THE DATA LOCATION.  THE DATA IS MOVED TO
                                ;SB5X AND R0 IS SET TO TWO PLUS THE ADDRESS OF SB5XAD.  FOLLOWING
                                ;THE MODE 5 SWAB SB5X IS CHECKED FOR THE PROPER DATA.  R0 IS
                                ;CHECKED TO SEE THAT IT WAS DECREMENTED PROPERLY.
                                ;
                                ;*******************************************************************************
                                ;TEST 201        TEST MODE 5 W/ SWAB INST.
                                ;*******************************************************************************
012514                          TS201:
012514  012700  012556                  MOV     #SB5XAD+2,R0    ;SET UP POINTER TO WORK LOCATION
012520  012767  125125  000024          MOV     #125125,SB5X    ;MOVE PATTERN TO WORK LOCATION
012526  000350                        SWAB    @-(R0)          ;TRY SWAB MODE 5
012530  022767  052652  000014          CMP     #52652,SB5X     ;CHECK RESULT
012536  001401                        BEQ     SB5A
012540  104000                        EMT                     ;RESULT OF SWAB INCORRECT
012542  020027  012554          SB5A:   CMP     R0,#SB5XAD      ;CHECK RESULT OF REG.
012546  001403                        BEQ     TS202
012550                          SB5:
012550  104000                        EMT                     ;REGISTER VALUE INCORRECT
012552  000000                  SB5X:   0                       ;WORK LOCATION
012554  012552                  SB5XAD: SB5X


                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 6 SWAB INSTRUCTION.  THIS TEST
                                ;USES A WORK LOCATION (SB6X) FOLLOWING THE TEST CODE.  TEST DATA
                                ;IS LOADED INTO THE WORK LOCATION.  R0, THE ADDRESSING REGISTER
                                ;IS LOADED WITH 6 LESS THEN THE ADDRESS OF THE WORK LOCATION.
                                ;THE MODE 6 SWAB IS EXECUTED WITH A +6 OFFSET.  THE DATA IS
                                ;VERIFIED WITH A COMPARE.
                                ;
                                ;*******************************************************************************
                                ;TEST 202        TEST MODE 6 W/ SWAB INST.
                                ;*******************************************************************************
012556                          TS202:
012556  012767  125125  000022          MOV     #125125,SB6X    ;MOVE PATTERN TO WORK LOCATION
012564  012700  012600                  MOV     #SB6X-6,R0      ;MOVE OFFSET POINTER TO R0
012570  000360  000006                  SWAB    6(R0)           ;TRY SWAB W/ MODE 6
012574  022760  052652  000006          CMP     #52652,6(R0)    ;CHECK RESULT
012602  001402                        BEQ     TS203
012604                          SB6:
012604  104000                        EMT                     ;RESULT OF SWAB INCORRECT
012606  000000                  SB6X:   0                       ;WORK LOCATION
```

```
4049
4050
4051                            ;*****************************************************************************
4052                            ;
4053                            ;       THIS TEST VERIFIES MODE 7 SWAB INSTRUCTION.  THIS TEST
4054                            ;USES TWO LOCATIONS FOLLOWING THE TEST CODE:  A WORK LOCATION
4055                            ;(SB7X) AND A POINTER TO THE WORK LOCATION (SB7XAD).  DATA IS MOVED
4056                            ;TO THE WORK LOCATION.  R0 IS LOADED WITH 72 LESS THAN THE ADDRESS
4057                            ;OF THE ADDRESS POINTER.  THE DATA IS SWAB'ED USING A MODE 7
4058                            ;INSTRUCTION WITH AN OFFSET OF +72.  THE DATA IS VERIFIED WITH A
4059                            ;COMPARE.
4060                            ;
4061                            ;*****************************************************************************
4062                            ;TEST 203       TEST MODE 7 W/ SWAB INST.
4063                            ;*****************************************************************************
4064  012610                    TS203:
4065  012610  012767  177400  000022        MOV     #177400,SB7X    ;MOVE PATTERN TO WORK LOCATION
4066  012616  012700  012550                MOV     #SB7XAD-72,R0   ;MOVE OFFSET POINTER TO R0
4067  012622  000370  000072                SWAB    @72(R0)         ;TRY SWAB MODE 7
4068  012626  027027  000072  000377        CMP     @72(R0),#377    ;CHECK RESULTS
4069  012634  001403                        BEQ     TS204
4070  012636                    SB7:
4071  012636  104000                        EMT                     ;RESULT OF SWAB INCORRECT
4072  012640  000000            SB7X:   0                           ;WORK LOCATION
4073  012642  012640            SB7XAD: SB7X                        ;POINTER TO WORK LOCATION
4074
4075
4076                            ;*****************************************************************************
4077                            ;
4078                            ;       THIS TEST VERIFIES ALL LEGAL MODES OF THE JMP INSTRUCTION.
4079                            ;BECAUSE OF THE NATURE OF THE INSTRUCTION UNDER TEST, THIS TEST
4080                            ;UTILIZES SEVERAL DIFFERENT TECHNIQUES.  THE CODE IS NOT EXECUTED
4081                            ;IN A LINEAR FASHION.  THE DIFFERENT MODES ARE EXECUTED IN ORDER
4082                            ;FROM 1-7; HOWEVER, THE CODE IS ARRANGED SO THAT CONTROL LEAP
4083                            ;FROGS THRU THE TEST CODE.  THE ORDER OF APPEARANCE OF THE CODE
4084                            ;IS:
4085                            ;       JMP MODE 1
4086                            ;       JMP MODE 3
4087                            ;       JMP MODE 2
4088                            ;       JMP MODE 4
4089                            ;       JMP MODE 6
4090                            ;       JMP MODE 5
4091                            ;       JMP MODE 7
4092                            ;AN INTERNAL SEQUENCE TEST (JMPSEQ) IS USED TO INSURE THAT THE
4093                            ;JUMPS ARE OCCURRING IN THE PROGRAMMED SEQUENCE.
4094                            ;       THE TEST IS MADE UP OF SEVERAL BLOCKS OF CODE.  EACH CODE
4095                            ;BEGINS WITH A LABEL WHICH INDICATES THE MODE BEING EXECUTED IN
4096                            ;THAT BLOCK.  A SIMPLE PROCEDURE IS FOLLOWED IN EACH BLOCK.  FOR
4097                            ;EXAMPLE THE CODE BEGINNING AT JMP3 WILL FIRST COMPARE THE RESULTS
4098                            ;OF THE PREVIOUS MODE 2 JUMP.  (ANY REGISTER CHANGES ARE VERIFIED
4099                            ;AND THE SEQUENCE CHECK IS MADE).  THEN THE REGISTERS ARE SETUP
4100                            ;FOR A MODE 3 JUMP TO THE NEXT TEST BLOCK (HERE, JMP4), THE SEQUENCE
4101                            ;CHECKER IS UPDATED AND THE JUMP IS EXECUTED.
4102                            ;       IF A FAILURE OCCURS, THE SEQUENCE CHECKER WILL ASSIST IN
4103                            ;DETERMINING JUST WHICH MODE FAILED.  IF THE SEQUENCE IS CORRECT
4104                            ;THEN THE ERROR DETECTED WAS A MODE FAILURE (E.G. FAILURE OF THE
```

```
                                        ;REGISTER TO BE INCREMENTED IN MODE 2 JUMP.)
                                        ;
                                        ;*****************************************************************************
                                        ;TEST 204       TEST THE JMP INSTRUCTION IN ALL MODES
                                        ;*****************************************************************************
012644                                  TS204:
012644  005067  C00240                          CLR     JMPSEQ          ;ESTABLISH A SEQUENCE CHECKER
012650  012700  012714                          MOV     #JMP2,R0        ;SET R0=JUMP TARGET
012654  000110                                  JMP     (R0)            ;TRY JMP MODE 1
012656  022700  012660                  JMP3:   CMP     #.+2,R0         ;CHECK RESULT OF MODE 2 JUMP
012662  001401                                  BEQ     JMP3A
012664  104000                                  EMT                     ;REGISTER VALUE AFTER JMP MODE 2 INCORRECT
012666  026727  000216  000001        JMP3A:  CMP     JMPSEQ,#1       ;MAKE SURE JMPS ARE IN SEQUENCE: JMPSEQ=1?
012674  001401                                  BEQ     JMP3B
012676  104000                                  EMT                     ;SHOULD BE HERE FROM JMP MODE 2 ONLY
012700  012700  012712                  JMP3B:  MOV     #IJMP4,R0       ;POINT R0 TO INDIRECT JMP ADDR.
012704  005267  000200                          INC     JMPSEQ          ;UPDATE SEQUENCE CHECKER
012710  000130                                  JMP     @(R0)+          ;TRY JMP MODE 3
012712  012736                  IJMP4:  JMP4                            ;ADDRESS INDIRECT JUMP
                                        
012714  005767  000170                  JMP2:   TST     JMPSEQ          ;CHECK THAT JMPS ARE IN SEQUENCE: JMPSEQ=0?
012720  001401                                  BEQ     JMP2A
012722  104000                                  EMT                     ;SHOULD BE HERE FROM JMP MODE 1 ONLY
012724  005267  000160                  JMP2A:  INC     JMPSEQ          ;UPDATE SEQUENCE CHECKER
012730  012700  012656                          MOV     #JMP3,R0        ;SET R0=JUMP TARGET
012734  000120                                  JMP     (R0)+           ;TRY A JUMP MODE 2 TO "JMP3"
012736  022700  012714                  JMP4:   CMP     #IJMP4+2,R0     ;CHECK RESULT OF REGISTER IN MODE 3 JUMP
012742  001401                                  BEQ     JMP4A
012744  104000                                  EMT                     ;REGISTER VALUE AFTER MODE 3 JUMP INCORRECT
012746  022767  000002  000134        JMP4A:  CMP     #2,JMPSEQ       ;CHECK JUMP SEQUENCE: JMPSEQ=2?
012754  001401                                  BEQ     JMP4B
012756  104000                                  EMT                     ;SHOULD BE ONLY FROM MODE 3 JUMP
012760  012700  013022                  JMP4B:  MOV     #JMP5+2,R0      ;SET UP POINTER TO JUMP TARGET
012764  005267  000120                          INC     JMPSEQ          ;UPDATE SEQUENCE CHECKER
012770  000140                                  JMP     -(R0)           ;TRY JUMP MODE 4 TO "JMP4"
                                        
012772  022767  000004  000110        JMP6:   CMP     #4,JMPSEQ       ;CHECK THAT JUMPS ARE IN SEQUENCE: JMPSEQ=4?
013000  001401                                  BEQ     JMP6A
013002  104000                                  EMT                     ;SHOULD BE HERE ONLY FROM MODE 5 JUMP
013004  012700  013444                  JMP6A:  MOV     #JMP7+376,R0    ;SET UP OFFSET POINTER TO JUMP TARGET
013010  005267  000074                          INC     JMPSEQ          ;UPDATE JUMP SEQUENCE
013014  000160  177402                          JMP     -376(R0)        ;TRY MODE 6 JUMP
                                        
013020  022767  000003  000062        JMP5:   CMP     #3,JMPSEQ       ;CHECK THAT JUMPS ARE IN SEQUENCE: JMPSEQ=3?
013026  001401                                  BEQ     JMP5A
013030  104000                                  EMT                     ;SHOULD ONLY BE HERE FROM MODE 4 JUMP
013032  012700  013046                  JMP5A:  MOV     #IJMP5+2,R0     ;SET UP POINTER TO INDIRECT JUMP ADDR.
013036  005267  000046                          INC     JMPSEQ          ;UPDATE JUMP SEQUENCE
013042  000150                                  JMP     @-(R0)          ;TRY JUMP MODE 5 TO "JMP6"
013044  012772                  IJMP5:  JMP6                            ;INDIRECT ADDRESS POINTER
                                        
013046  022767  000005  000034        JMP7:   CMP     #5,JMPSEQ       ;CHECK JUMPS IN SEQUENCE: JMPSEQ=5?
013054  001401                                  BEQ     JMP7A
013056  104000                                  EMT                     ;SHOULD ONLY BE HERE FROM MODE 6 JUMP
013060  012700  013104                  JMP7A:  MOV     #IJMP+10,R0     ;SET UP OFFSET POINTER TO INDIRECT ADDR.
013064  005267  000020                          INC     JMPSEQ          ;UPDATE JUMP SEQUENCE
```

```
4161  013070  000170  177770            JMP     @-10(R0)        ;TRY MODE 7 JUMP
4162  013074  013076                    IJMP:   JMPCK           ;INDIRECT ADDRESS
4163
4164  013076  026727  000006  000006    JMPCK:  CMP     JMPSEQ,#6       ;CHECK JUMPS IN SEQUENCE: JMPSEQ
4165  013104  001402                            BEQ     TS205
4166  013106  104000                            EMT                     ;SHOULD ONLY BE HERE FROM MODE 6 JUMP
4167  013110  000000                    JMPSEQ: 0
4168
4169                                    ;*****************************************************************************
4170                                    ;
4171                                    ;       THIS TEST VERIFIES ALL LEGAL MODES OF THE JSR INSTRUCTION.
4172                                    ;THE CONCEPT OF LEAP FROGGING AND SEQUENCE CHECKING (JSRSEQ) IS
4173                                    ;IDENTICAL TO THAT USED IN JMP TEST (SEE PREVIOUS TEST).  EACH
4174                                    ;BLOCK OF CODE VERIFIES THE PREVIOUS JSR BY CHECKING THE SEQUENCE,
4175                                    ;CHECKING THAT THE PC WAS SAVED IN THE SPECIFIED REGISTER, CHECKING
4176                                    ;THAT THE SP WAS DECREMENTED, CHECKING THAT THE REGISTER WAS
4177                                    ;SAVED ON THE STACK, AND FINALLY CHECKING THAT ANY MODE ADDRESS
4178                                    ;REGISTER ALTERATIONS (E.G. INCREMENT REGISTER IN MODE 2) WERE
4179                                    ;SUCCESSFUL.  R1 IS USED AS THE REGISTER IN ALL JSR INSTRUCTIONS.
4180                                    ;       IF A FAILURE OCCURS, THE SEQUENCE CHECKER WILL ASSIST IN
4181                                    ;DETERMINING JUST WHICH MODE FAILED.  IF THE SEQUENCE IS CORRECT
4182                                    ;THEN THE ERROR DETECTED WAS A FUNCTIONAL FAILURE (E.G., INCORRECT
4183                                    ;REGISTER SAVED).
4184                                    ;
4185                                    ;*****************************************************************************
4186                                    ;TEST 205       TEST JSR INSTRUCTION W/ ALL MODES
4187                                    ;*****************************************************************************
4188  013112                            TS205:
4189  013112  000402                            BR      JSR1
4190  013114  000137  013476            JSR0:   JMP     @#JSRCK1
4191
4192  013120  012706  001000            JSR1:   MOV     #STBOT,R6       ;SET STACK POINTER
4193  013124  012700  013216                    MOV     #JSR2,R0        ;SET TARGET ADDRESS
4194  013130  005037  013456                    CLR     @#JSRSEQ        ;INITIALIZE SEQUENCE CHECKER
4195  013134  005001                            CLR     R1              ;INITIALIZE R1
4196  013136  005101                            COM     R1
4197  013140  004110                            JSR     R1,(R0)         ;TRY JSR MODE 1
4198                                                                    ; TO SCOPE: REPLACE THE MOVE INSTRUCTION   <=
4199                                                                    ;           FOLLOWING W/ 774               <-=
4200  013142                            JSR1A:
4201  013142  104000                            EMT                     ;JSR MODE 1 FAILED
4202
4203  013144  022737  000001  013456    JSR3:   CMP     #1,@# JSRSEQ    ;CHECK SEQUENCE: JSRSEQ=1?
4204  013152  001014                            BNE     JSR3A           ;BRANCH IF OUT OF SEQUENCE
4205  013154  020127  013272                    CMP     R1,#JSR4        ;PROPER PC SAVED?
4206  013160  001011                            BNE     JSR3A           ;BRANCH IF PC WRONG
4207  013162  022706  000776                    CMP     #STBOT-2,R6     ;STACK POINTER DECREMENTED?
4208  013166  001006                            BNE     JSR3A           ;BRANCH IF SP WRONG
4209  013170  022716  125252                    CMP     #125252,(R6)    ;REG SAVED ON STACK?
4210  013174  001003                            BNE     JSR3A           ;BRANCH IF REG. NOT SAVED
4211  013176  022700  013146                    CMP     #JSR3+2,R0      ;MODE 2 INCREMENT CORRECT?
4212  013202  001401                            BEQ     JSR3B
4213  013204                            JSR3A:
4214  013204  104000                            EMT                     ;JSR MODE 3 MALFUNCTIONED
4215  013206  005237  013456            JSR3B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
4216  013212  004137  013272                    JSR     R1,@#JSR4       ;TRY JSR MODE 4
```

```
4217
4218  013216  005737  013456          JSR2:   TST     @#JSRSEQ        ;CHECK SEQUENCE: JSRSEQ=0?
4219  013222  001011                          BNE     JSR2A           ;BRANCH IF OUT OF SEQUENCE
4220  013224  020127  013142                  CMP     R1,#JSR1A       ;PROPER PC SAVED?
4221  013230  001006                          BNE     JSR2A           ;BRANCH IF PC WRONG
4222  013232  022706  000776                  CMP     #STBOT-2,R6     ;R6 DECREMENT?
4223  013236  001003                          BNE     JSR2A           ;BRANCH IF R6 IS INCORRECT
4224  013240  021627  177777                  CMP     (R6),#-1        ;REGISTER SAVED?
4225  013244  001401                          BEQ     JSR2B
4226  013246                          JSR2A:
4227  013246  104000                          EMT                     ;JSR MODE 1 MALFUNCTIONED
4228  013250  012706  001000          JSR2B:  MOV     #STBOT,R6       ;INITIALIZE R6
4229  013254  012701  125252                  MOV     #125252,R1      ;INITIALIZE R1
4230  013260  005237  013456                  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
4231  013264  012700  013144                  MOV     #JSR3,R0        ;SET TARGET ADDRESS
4232  013270  004120                          JSR     R1,(R0)+        ;TRY JSR MODE 2
4233
4234  013272  022737  000002  013456  JSR4:   CMP     #2,@#JSRSEQ     ;CHECK SEQUENCE: JSRSEQ=2?
4235  013300  001003                          BNE     JSR4A           ;BRANCH IF OUT OF SEQUENCE
4236  013302  022701  013216                  CMP     #JSR2,R1        ;PROPER PC SAVED?
4237  013306  001401                          BEQ     JSR4B
4238  013310                          JSR4A:
4239  013310  104000                          EMT                     ;JSR MODE 3 MALFUNCTIONED
4240  013312  005237  013456          JSR4B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
4241  013316  012700  013364                  MOV     #JSR5+2,R0      ;SET TARGET ADDRESS
4242  013322  004140                          JSR     R1,-(R0)        ;TRY JSR MODE 4
4243
4244  013324  022767  000004  000124  JSR6:   CMP     #4,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=4?
4245  013332  001006                          BNE     JSR6A           ;BRANCH IF OUT OF SEQUENCE
4246  013334  022701  013422                  CMP     #JSR7,R1        ;PROPER PC SAVED?
4247  013340  001003                          BNE     JSR6A           ;BRANCH IF PC WRONG
4248  013342  022700  013452                  CMP     #JSR6AD,R0      ;MODE 5 REGISTER CORRECT?
4249  013346  001401                          BEQ     JSR6B
4250  013350                          JSR6A:
4251  013350  104000                          EMT                     ;JSR MODE 5 FAILED
4252  013352  005237  013456          JSR6B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
4253  013356  004167  000040                  JSR     R1,JSR7         ;TRY JSR MODE 6
4254  013362  022767  000003  000066  JSR5:   CMP     #3,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=3?
4255  013370  001006                          BNE     JSR5A           ;BRANCH IF OUT OF SEQUENCE
4256  013372  022701  013324                  CMP     #JSR6,R1        ;PROPER PC SAVED?
4257  013376  001003                          BNE     JSR5A           ;BRANCH IF PC WRONG
4258  013400  022700  013362                  CMP     #JSR5,R0        ;CHECK MODE 4 REGISTER
4259  013404  001401                          BEQ     JSR5B
4260  013406                          JSR5A:
4261  013406  104000                          EMT                     ;JSR MODE 4 MALFUNCTIONED
4262  013410  005237  013456          JSR5B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
4263  013414  012700  013454                  MOV     #JSR6AD+2,R0    ;POINT R0 TO TARGET ADDRESS
4264  013420  004150                          JSR     R1,@-(R0)       ;TRY JSR MODE 5
4265
4266  013422  022737  000005  013456  JSR7:   CMP     #5,@#JSRSEQ     ;CHECK SEQUENCE: JSRSEQ=5?
4267  013430  001003                          BNE     JSR7A           ;BRANCH IF OUT OF SEQUENCE
4268  013432  022701  013362                  CMP     #JSR5,R1        ;PROPER PC SAVED?
4269  013436  001401                          BEQ     JSR7B
4270  013440                          JSR7A:
4271  013440  104000                          EMT                     ;JSR MODE 6 FAILED
4272  013442  005237  013456          JSR7B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
```

```
4273  013446  004177  000002              JSR     R1,@JSRCKAD     ;TRY JSR MODE 7
4274
4275  013452  013324                  JSR6AD: JSR6                    ;MODE 5 TARGET ADDRESS
4276  013454  013460                  JSRCKAD:JSRCK                   ;MODE 7 TARGET ADDRESS
4277  013456  000000                  JSRSEQ: 0                       ;SEQUENCE CHECKER
4278
4279  013460  022767  000006  177770 JSRCK:  CMP     #6,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=6?
4280  013466  001003                         BNE     JSRCK1          ;BRANCH IF OUT OF SEQUENCE
4281  013470  022701  013452                 CMP     #JSR6AD,R1      ;PROPER PC SAVED?
4282  013474  001401                         BEQ     TS206
4283  013476                          JSRCK1:
4284  013476  104000                         EMT                     ;JSR MODE 7 MALFUNCTIONED
4285
4286
4287                                  ;*******************************************************************************
4288                                  ;
4289                                  ;       THIS TEST VERIFIES THE RTS INSTRUCTION.  THE STACK POINTER
4290                                  ;IS INITIALIZED AND A TEST PATTERN STORED ON STACK.  R0 IS LOADED
4291                                  ;WITH RETURN ADDRESS.  AN RTS IS EXECUTED, AND, AT THE TARGET
4292                                  ;ADDRESS, A CHECK IS MADE THAT R0 WAS PROPERLY RESTORED FROM THE
4293                                  ;STACK.
4294                                  ;*******************************************************************************
4295                                  ;TEST 206       TEST RTS INSTRUCTION
4296                                  ;*******************************************************************************
4297  013500                          TS206:
4298  013500  012706  001000                 MOV     #STBOT,R6       ;INITIALIZE STACK POINTER
4299  013504  012746  052525                 MOV     #52525,-(R6)    ;INITIALIZE TOP OF STACK
4300  013510  012700  013520                 MOV     #RTS1,R0        ;INITIALIZE RETURN REGISTER
4301  013514  000200                         RTS     R0              ;TRY RTS THROUGH R0
4302                                                                  ; TO SCOPE: REPLACE THE MOVE INSTRUCTION   <===-
4303                                                                  ;           FOLLOWING W/ 770               <====
4304  013516  104000                         EMT                     ;RTS FAILED
4305  013520  022700  052525         RTS1:  CMP     #52525,R0       ;CHECK THAT R0 RESTORED FROM STACK
4306  013524  001401                         BEQ     TS207
4307  013526  104000                         EMT                     ;RTS MALFUNCTIONED
4308                                  ;*******************************************************************************
4309                                  ;
4310                                  ;       THESE NEXT FOUR TESTS VERIFY THE FUNCTIONING OF A GROUP
4311                                  ;OF FOUR INSTRUCTIONS.  THE GROUP CONSISTS OF THE INSTRUCTIONS:
4312                                  ;MOV, BIC, BIT, AND BIS.  THESE INSTRUCTIONS ARE SIMILAR IN THE
4313                                  ;WAY THEY EFFECT THE C AND V BITS.  THEY ALL LEAVE THE V-BIT
4314                                  ;CLEAR AND THE C-BIT UNAFFECTED.
4315                                  ;       THE TEST PROCEDURE IS AS FOLLOWS:  THE N, Z, AND V BITS
4316                                  ;ARE LOADED WITH THE COMPLEMENT OF THE EXPECTED RESULTS, THE C-BIT
4317                                  ;IS LOADED WITH THE DESIRED RESULT.  THE INSTRUCTION IS EXECUTED
4318                                  ;WITH DIFFERENT DATA PATTERNS AND THE RESULTS ARE VERIFIED WITH
4319                                  ;A SERIES OF CONDITIONAL BRANCH INSTRUCTIONS.  THE DATA IS CHOSEN
4320                                  ;TO PRODUCT ALL POSSIBLE COMBINATIONS OF THE C AND V BITS.
4321                                  ;
4322                                  ;*******************************************************************************
4323                                  ;TEST 207       TEST MOV INSTRUCTION
4324                                  ;*******************************************************************************
4325  013530                          TS207:
4326  013530  000277                         SCC                     ;CC=0110
4327  013532  000251                         +CLN!CLC
4328  013534  012700  100000                 MOV     #100000,R0      ;CC=1000
```

```
 4329  013540  101402                        BLOS    MOV1
 4330  013542  102401                        BVS     MOV1
 4331  013544  100401                        BMI     MOV2
 4332  013546                        MOV1:
 4333  013546  104000                        EMT                     ;MOV DID NOT SET CC'S CORRECTLY
 4334
 4335  013550  000277                MOV2:   SCC                     ;CC=1011
 4336  013552  000244                        CLZ
 4337  013554  012700  000000              MOV     #0,R0             ;CC=0101
 4338  013560  101002                        BHI     MOV3            ;C OR Z = 0?
 4339  013562  102401                        BVS     MOV3            ;V=1?
 4340  013564  100001                        BPL     TS210
 4341  013566                        MOV3:
 4342  013566  104000                        EMT                     ;MOV DID NOT SET CC'S CORRECTLY
 4343                                ;*******************************************************************************
 4344                                ;TEST 210       TEST BIT INSTRUCTION
 4345                                ;*******************************************************************************
 4346  013570                        TS210:
 4347  013570  012700  100001              MOV     #100001,R0
 4348  013574  000277                        SCC                     ;CC=0110
 4349  013576  000251                        +CLN!CLC
 4350  013600  032700  100000              BIT     #100000,R0        ;CC=1000
 4351  013604  101402                        BLOS    BITST1
 4352  013606  102401                        BVS     BITST1
 4353  013610  100401                        BMI     BITST2
 4354  013612                        BITST1:
 4355  013612  104000                        EMT                     ;BIT DID NOT SET CC'S CORRECTLY
 4356
 4357  013614  000277                BITST2: SCC                     ;CC=1011
 4358  013616  000244                        CLZ
 4359  013620  032700  077776              BIT     #77776,R0         ;CC=0101
 4360  013624  101002                        BHI     BITST3
 4361  013626  102401                        BVS     BITST3
 4362  013630  100001                        BPL     TS211
 4363  013632                        BITST3:
 4364  013632  104000                        EMT                     ;BIT DID NOT SET CC'S CORRECTLY
 4365                                ;*******************************************************************************
 4366                                ;TEST 211       TEST BIC INSTRUCTION
 4367                                ;*******************************************************************************
 4368  013634                        TS211:
 4369  013634  012700  177777              MOV     #177777,R0
 4370  013640  000277                        SCC                     ;CC=0110
 4371  013642  000251                        +CLN!CLC
 4372  013644  042700  077777              BIC     #77777,R0         ;CC=1000
 4373  013650  101402                        BLOS    BIC1
 4374  013652  102401                        BVS     BIC1
 4375  013654  100401                        BMI     BIC2
 4376  013656                        BIC1:
 4377  013656  104000                        EMT                     ;BIC DID NOT SET CC'S CORRECTLY
 4378  013660  000277                BIC2:   SCC                     ;CC=1011
 4379  013662  000244                        CLZ
 4380  013664  042700  100000              BIC     #100000,R0        ;CC=0101
 4381  013670  101002                        BHI     BIC3
 4382  013672  102401                        BVS     BIC3
 4383  013674  100001                        BPL     TS212
 4384  013676                        BIC3:
```

```
 4385  013676  104000                        EMT                     ;BIC DID NOT SET CC'S CORRECTLY
 4386                                ;*****************************************************************************
 4387                                ;TEST 212       TEST BIS INSTRUCTION
 4388                                ;*****************************************************************************
 4389  013700                        TS212:
 4390  013700  005000                        CLR     R0              ;R0=0
 4391  013702  000277                        SCC                     ;CC=1010
 4392  013704  000251                        +CLN!CLC
 4393  013706  052700  000000                BIS     #0,R0           ;CC=0100  R0=0
 4394  013712  103403                        BCS     BIS1
 4395  013714  102402                        BVS     BIS1
 4396  013716  100401                        BMI     BIS1
 4397  013720  001401                        BEQ     BIS2
 4398  013722                        BIS1:
 4399  013722  104000                        EMT                     ;BIS DID NOT SET CC'S CORRECTLY
 4400  013724  000277                BIS2:   SCC                     ;CC=0111
 4401  013726  000250                        CLN
 4402  013730  052700  177777                BIS     #177777,R0      ;CC=1001
 4403  013734  103003                        BCC     BIS3
 4404  013736  102402                        BVS     BIS3
 4405  013740  001401                        BEQ     BIS3
 4406  013742  100401                        BMI     TS213
 4407  013744                        BIS3:
 4408  013744  104000                        EMT                     ;BIS DID NOT SET CC'S CORRECTLY
 4409
 4410                                ;*****************************************************************************
 4411                                ;
 4412                                ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE INC AND
 4413                                ;DEC INSTRUCTIONS.  THESE INSTRUCTIONS BOTH EFFECT THE C AND V
 4414                                ;BITS THE SAME; THE C-BIT IS LEFT UNCHANGED AND THE V-BIT IS DEPENDENT
 4415                                ;UPON THE DATA RESULTS.  THE SAME PROCEDURE IS USED.  THE CONDITION
 4416                                ;CODE BITS ARE INITIALIZED, THE INSTRUCTION IS EXECUTED AND THE
 4417                                ;RESULTS ARE VERIFIED WITH A SERIES OF CONDITIONAL BRANCH INSTRUCTIONS.
 4418                                ;THIS PROCEDURE IS REPEATED WITH SEVERAL DATA PATTERNS TO PRODUCE
 4419                                ;DIFFERENT COMBINATIONS OF THE C AND V BITS.
 4420                                ;
 4421                                ;*****************************************************************************
 4422                                ;TEST 213       TEST INC INSTRUCTION
 4423                                ;*****************************************************************************
 4424  013746                        TS213:
 4425  013746  012700  077777                MOV     #077777,R0      ;R0=077777
 4426  013752  000257                        CCC                     ;CC=0100
 4427  013754  000264                        SEZ
 4428  013756  005200                        INC     R0              ;CC=1010   R0=10000
 4429  013760  101402                        BLOS    INC1
 4430  013762  100001                        BPL     INC1
 4431  013764  102401                        BVS     INC2
 4432  013766                        INC1:
 4433  013766  104000                        EMT                     ;INC DID NOT SET CC'S CORRECTLY
 4434  013770  052700  077777        INC2:   BIS     #77777,R0       ;R0=177777
 4435  013774  000261                        SEC                     ;CC=1011
 4436  013776  000244                        CLZ
 4437  014000  005200                        INC     R0              ;CC=0101   R0=0
 4438  014002  100403                        BMI     INC3
 4439  014004  102402                        BVS     INC3
 4440  014006  103001                        BCC     INC3
```

```
4441  014010  001401                        BEQ     INC4
4442  014012                        INC3:
4443  014012  104000                        EMT                     ;INC DID NOT SET CC'S CORRECTLY
4444
4445  014014  000277                INC4:   SCC                     ;CC=1110
4446  014016  000241                        CLC
4447  014020  005200                        INC     R0              ;CC=0000   R0=1
4448  014022  101402                        BLOS    INC5
4449  014024  100401                        BMI     INC5
4450  014026  100001                        BPL     TS214
4451  014030                        INC5:
4452  014030  104000                        EMT                     ;INC DID NOT SET CC'S CORRECTLY
4453
4454                                ;*******************************************************************************
4455                                ;TEST 214       TEST DEC INSTRUCTION
4456                                ;*******************************************************************************
4457  014032                        TS214:
4458  014032  012700  000002               MOV     #2,R0           ;R0=2
4459  014036  000277                        SCC                     ;CC=1111
4460  014040  005300                        DEC     R0              ;CC=0001   R0=1
4461  014042  100403                        BMI     DEC1
4462  014044  001402                        BEQ     DEC1
4463  014046  102401                        BVS     DEC1
4464  014050  103401                        BCS     DEC2
4465  014052                        DEC1:
4466  014052  104000                        EMT                     ;DEC DID NOT SET CC'S CORRECTLY
4467  014054  000261                DEC2:   SEC                     ;CC=1011
4468  014056  000244                        CLZ
4469  014060  005300                        DEC     R0              ;CC=0101   R0=0
4470  014062  101002                        BHI     DEC3
4471  014064  100401                        BMI     DEC3
4472  014066  102001                        BVC     DEC4
4473  014070                        DEC3:
4474  014070  104000                        EMT                     ;DEC DID NOT SET CC'S CORRECTLY
4475  014072  000277                DEC4:   SCC                     ;CC=0110
4476  014074  000251                        +CLN!CLC
4477  014076  005300                        DEC     R0              ;CC=1000   R0=177777
4478  014100  101402                        BLOS    DEC5
4479  014102  102401                        BVS     DEC5
4480  014104  100401                        BMI     DEC6
4481  014106                        DEC5:
4482  014106  104000                        EMT                     ;DEC DID NOT SET CC'S CORRECTLY
4483  014110  042700  077777        DEC6:   BIC     #77777,R0       ;R0=100000
4484  014114  000277                        SCC                     ;CC=0101
4485  014116  000252                        +CLN!CLV
4486  014120  005300                        DEC     R0              ;CC=1011   R0=77777
4487  014122  100403                        BMI     DEC7            ;CC=0011
4488  014124  001402                        BEQ     DEC7
4489  014126  102001                        BVC     DEC7
4490  014130  103401                        BCS     TS215
4491  014132                        DEC7:
4492  014132  104000                        EMT                     ;DEC DID NOT SET CC'S CORRECTLY
4493
4494
4495                                ;*******************************************************************************
4496                                ;
```

```
                        ;       THESE NEXT THREE TESTS VERIFY THE FUNCTIONING OF THE CLR,
                        ;TST, AND SWAB INSTRUCTIONS.  THESE THREE INSTRUCTIONS ALL LEAVE
                        ;THE C AND V BITS CLEARED.  AGAIN, THE CONDITION CODES ARE PRESET,
                        ;THE INSTRUCTION EXECUTED AND THE RESULTS CHECKED WITH CONDITIONAL
                        ;BRANCH INSTRUCTIONS.  THE PROCEDURE IS REPEATED TO PRODUCE OTHER
                        ;COMBINATIONS OF CONDITION CODES.
                        ;
                        ;*****************************************************************************
                        ;TEST 215       TEST CLR INSTRUCTION
                        ;*****************************************************************************
014134                  TS215:
014134  000277                  SCC                     ;CC=1011
014136  000244                  CLZ
014140  005000                  CLR     R0              ;CC=0100   R0=0
014142  100403                  BMI     CLR1
014144  102402                  BVS     CLR1
014146  103401                  BCS     CLR1
014150  001401                  BEQ     TS216
014152                  CLR1:
014152  104000                  EMT                     ;CLR DID NOT SET CC'S CORRECTLY

                        ;*****************************************************************************
                        ;TEST 216       TEST TST INSTRUCTION
                        ;*****************************************************************************
014154                  TS216:
014154  000277                  SCC                     ;CC=1011
014156  000244                  CLZ
014160  005700                  TST     R0              ;CC=0100
014162  100403                  BMI     TEST1
014164  102402                  BVS     TEST1
014166  103401                  BCS     TEST1
014170  001401                  BEQ     TEST2
014172                  TEST1:
014172  104000                  EMT                     ;TEST DID NOT SET CC'S CORRECTLY
014174  005300          TEST2:  DEC     R0              ;MAKE R0 NEGATIVE
014176  000277                  SCC                     ;CC=0111
014200  000250                  CLN
014202  005700                  TST     R0              ;CC=1000
014204  101402                  BLOS    TEST3
014206  102401                  BVS     TEST3
014210  100401                  BMI     TS217
014212                  TEST3:
014212  104000                  EMT                     ;TEST DID NOT SET CC'S CORRECTLY
                        ;*****************************************************************************
                        ;TEST 217       TEST SWAB INSTRUCTION
                        ;*****************************************************************************
014214                  TS217:
014214  012700  170000          MOV     #170000,R0      ;R0=170000
014220  000277                  SCC                     ;CC=0111
014222  000250                  CLN
014224  000300                  SWAB    R0              ;CC=1000   R0=360
014226  101402                  BLOS    SWB1
014230  102401                  BVS     SWB1
014232  100401                  BMI     SWB2
014234                  SWB1:
014234  104000                  EMT                     ;SWAB DID NOT SET CC'S CORRECTLY
```

```
 4553  014236  000277                SWB2:   SCC                     ;CC=1011
 4554  014240  000244                        CLZ
 4555  014242  000300                        SWAB    R0              ;CC=0100   R0=170000
 4556  014244  102403                        BVS     SWB3
 4557  014246  103402                        BCS     SWB3
 4558  014250  100401                        BMI     SWB3
 4559  014252  001401                        BEQ     TS220
 4560  014254                        SWB3:
 4561  014254  104000                        EMT                     ;
 4562
 4563                                ;*****************************************************************************************
 4564                                ;
 4565                                ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE ADD AND
 4566                                ;ADC INSTRUCTIONS.  BOTH OF THESE INSTRUCTIONS HANDLE THE C AND
 4567                                ;V BITS IDENTICALLY.  THE PROCEDURE IS TO PRESET THE CONDITION
 4568                                ;CODES, EXECUTE THE INSTRUCTION WITH A PARTICULAR SET OF DATA, AND
 4569                                ;THEN CHECK THE RESULTS BY EXECUTING A SERIES OF CONDITIONAL
 4570                                ;BRANCHES.  THES PROCEDURE IS REPEATED SEVERAL TIMES WITH DIFFERENT
 4571                                ;DATA TO PRODUCE EVERY COMBINATION OF C AND V BITS.
 4572                                ;
 4573                                ;*****************************************************************************************
 4574                                ;TEST 220       TEST ADD INSTRUCTION
 4575                                ;*****************************************************************************************
 4576  014256                        TS220:
 4577  014256  012700  040000               MOV     #40000,R0       ;R0=40000
 4578  014262  000277                        SCC                     ;CC=1111
 4579  014264  062700  030000               ADD     #30000,R0       ;CC=0000   R0=70000
 4580  014270  101402                        BLOS    ADD1
 4581  014272  102401                        BVS     ADD1
 4582  014274  100001                        BPL     ADD2
 4583  014276                        ADD1:
 4584  014276  104000                        EMT                     ;ADD DID NOT SET CC'S CORRECTLY
 4585  014300  000264                ADD2:   SEZ                     ;CC=0100
 4586
 4587  014302  062700  010000               ADD     #10000,R0       ;CC=1010   40=100000
 4588  014306  101402                        BLOS    ADD3
 4589  014310  102001                        BVC     ADD3
 4590  014312  100401                        BMI     ADD4
 4591  014314                        ADD3:
 4592  014314  104000                        EMT                     ;ADD DID NOT SET CC'S CORRECTLY
 4593  014316  000257                ADD4:   CCC                     ;CC=1000
 4594  014320  000270                        SEN
 4595  014322  062700  100000               ADD     #100000,R0      ;CC=0111   R0=0
 4596  014326  101002                        BHI     ADD5
 4597  014330  102001                        BVC     ADD5
 4598  014332  100001                        BPL     ADD6
 4599  014334                        ADD5:
 4600  014334  104000                        EMT                     ;ADD DID NOT SET CC'S CORRECTLY
 4601  014336  062700  177777        ADD6:   ADD     #177777,R0      ;CC=1000   R0=177777
 4602  014342  101402                        BLOS    ADD7
 4603  014344  102401                        BVS     ADD7
 4604  014346  100401                        BMI     ADD8
 4605  014350                        ADD7:
 4606  014350  104000                        EMT                     ;ADD DID NOT SET CC'S CORRECTLY
 4607  014352  000277                ADD8:   SCC                     ;CC=1010
 4608  014354  000245                        +CLC!CLZ
```

```
 4609  014356  062700  000001          ADD     #1,R0           ;CC=0101   R=0
 4610  014362  102403                  BVS     ADD9
 4611  014364  103002                  BCC     ADD9
 4612  014366  100401                  BMI     ADD9
 4613  014370  001401                  BEQ     TS221
 4614  014372                  ADD9:
 4615  014372  104000                  EMT                     ;ADD DID NOT SET CC'S CORRECTLY
 4616
 4617          ;*************************************************************************************
 4618          ;TEST 221       TEST ADC INSTRUCTION
 4619          ;*************************************************************************************
 4620  014374  TS221:
 4621  014374  012700  077777          MOV     #077777,R0
 4622  014400  000277                  SCC                     ;CC=0101
 4623  014402  000252                  +CLN!CLV
 4624  014404  005500                  ADC     R0              ;CC=1010
 4625  014406  101402                  BLOS    ADC1
 4626  014410  102001                  BVC     ADC1
 4627  014412  100401                  BMI     ADC2
 4628  014414                  ADC1:
 4629  014414  104000                  EMT                     ;ADC DID NOT SET CC'S CORRECTLY
 4630  014416  052700  077777  ADC2:   BIS     #77777,R0
 4631  014422  000277                  SCC                     ;CC=1011
 4632  014424  000244                  CLZ
 4633  014426  005500                  ADC     R0              ;CC=0101   R0=0
 4634  014430  101002                  BHI     ADC3
 4635  014432  102401                  BVS     ADC3
 4636  014434  100001                  BPL     ADC4
 4637  014436                  ADC3:
 4638  014436  104000                  EMT                     ;ADC DID NOT SET CC'S CORRECTLY
 4639  014440  000277          ADC4:   SCC
 4640  014442  000245                  +CLZ!CLC                        ;CC=1010
 4641  014444  005500                  ADC     R0              ;CC=0100
 4642  014446  102403                  BVS     ADC5
 4643  014450  103402                  BCS     ADC5
 4644  014452  100401                  BMI     ADC5
 4645  014454  001401                  BEQ     TS222
 4646  014456                  ADC5:
 4647  014456  104000                  EMT                     ;ADC DID NOT SET CC'S CORRECTLY
 4648
 4649          ;*************************************************************************************
 4650          ;
 4651          ;       THESE NEXT THREE TESTS VERIFY THE FUNCTIONING OF THE NEG,
 4652          ;CMP, AND COM INSTRUCTIONS.  EACH OF THESE INSTRUCTIONS GENERATE
 4653          ;THE C AND V BITS IDENTICALLY.  THE CONDITION CODES ARE PRESET,
 4654          ;THE INSTRUCTIONS EXECUTED, AND THE RESULTS CHECKED WITH A SERIES
 4655          ;OF CONDITIONAL BRANCH INSTRUCTIONS.  THIS PROCEDURE IS REPEATED
 4656          ;SEVERAL TIMES WITH DIFFERENT DATA IN ORDER TO GENERATE DIFFERENT
 4657          ;COMBINATIONS OF THE C AND V BITS.
 4658          ;
 4659          ;*************************************************************************************
 4660          ;TEST 222       TEST NEG INSTRUCTION
 4661          ;*************************************************************************************
 4662  014460  TS222:
 4663  014460  012700  000001          MOV     #1,R0
 4664  014464  000277                  SCC                     ;CC=0110
```

```
4665  014466  000251                  +CLN!CLC
4666  014470  005400                  NEG     R0              ;CC=1001   R0=177777
4667  014472  103003                  BCC     NEG1
4668  014474  102402                  BVS     NEG1
4669  014476  001401                  BEQ     NEG1
4670  014500  100401                  BMI     NEG2
4671  014502                  NEG1:
4672  014502  104000                  EMT                     ;NEG DID NOT SET CC'S CORRECTLY
4673  014504  042700  077777  NEG2:   BIC     #77777,R0
4674  014510  000257                  CCC                     ;CC=0100
4675  014512  000264                  SEZ
4676  014514  005400                  NEG     R0              ;CC=1011   R0=100000
4677  014516  102003                  BVC     NEG3
4678  014520  103002                  BCC     NEG3
4679  014522  001401                  BEQ     NEG3
4680  014524  100401                  BMI     NEG4
4681  014526                  NEG3:
4682  014526  104000                  EMT                     ;NEG DID NOT SET CC'S CORRECTLY
4683  014530  005000  NEG4:   CLR     R0
4684  014532  000277                  SCC                     ;CC=1011
4685  014534  000244                  CLZ
4686  014536  005400                  NEG     R0              ;CC=0100   R0=0
4687  014540  102403                  BVS     NEG5
4688  014542  103402                  BCS     NEG5
4689  014544  001001                  BNE     NEG5
4690  014546  100001                  BPL     TS223
4691  014550                  NEG5:
4692  014550  104000                  EMT                     ;NEG DID NOT SET CC'S CORRECTLY
4693
4694                          ;*******************************************************************************************
4695                          ;TEST 223       TEST CMP INSTRUCTION
4696                          ;*******************************************************************************************
4697  014552                  TS223:
4698  014552  012700  000005          MOV     #5,R0
4699  014556  000257                  CCC                     ;CC=1010
4700  014560  000271                  +SEN!SEC
4701  014562  022700  000005          CMP     #5,R0           ;CC=0101
4702  014566  101002                  BHI     CMP1
4703  014570  102401                  BVS     CMP1
4704  014572  100001                  BPL     CMP2
4705  014574                  CMP1:
4706  014574  104000                  EMT                     ;CMP DID NOT SET CC'S CORRECTLY
4707  014576  012700  100000  CMP2:   MOV     #100000,R0
4708  014602  000277                  SCC                     ;CC=1101
4709  014604  000242                  CLV
4710  014606  020027  077777          CMP     R0,#77777       ;CC=0010
4711  014612  101402                  BLOS    CMP3
4712  014614  102001                  BVC     CMP3
4713  014616  100001                  BPL     CMP4
4714  014620                  CMP3:
4715  014620  104000                  EMT                     ;CMP DID NOT SET CC'S CORRECTLY
4716  014622  052700  040000  CMP4:   BIS     #40000,R0       ;R0=140000
4717  014626  000257                  CCC                     ;CC=0100
4718  014630  000264                  SEZ
4719  014632  022700  040000          CMP     #40000,R0       ;CC=1011
4720  014636  102003                  BVC     CMP5
```

```
 4721  014640  103002                        BCC     CMP5
 4722  014642  001401                        BEQ     CMP5
 4723  014644  100401                        BMI     CMP6
 4724  014646                        CMP5:
 4725  014646  104000                        EMT                     ;CMP DID NOT SET CC'S CORRECTLY
 4726  014650  042700  040000        CMP6:   BIC     #40000,R0
 4727  014654  000277                        SCC                     ;CC=1111
 4728  014656  022700  177777                CMP     #-1,R0          ;CC=0000
 4729  014662  101402                        BLOS    CMP7
 4730  014664  102401                        BVS     CMP7
 4731  014666  100001                        BPL     TS224
 4732  014670                        CMP7:
 4733  014670  104000                        EMT                     ;CMP DID NOT SET CC'S CORRECTLY
 4734
 4735                          ;*****************************************************************************
 4736                          ;TEST 224       TEST COM INSTRUCTION
 4737                          ;*****************************************************************************
 4738  014672                        TS224:
 4739  014672  012700  177777                MOV     #-1,R0
 4740  014676  000257                        CCC                     ;CC=1010
 4741  014700  000265                        +SEC!SEZ
 4742  014702  005100                        COM     R0              ;CC=0101
 4743  014704  101002                        BHI     COM1
 4744  014706  102401                        BVS     COM1
 4745  014710  100001                        BPL     TS225
 4746  014712                        COM1:
 4747  014712  104000                        EMT                     ;COM DID NOT SET CC'S CORRECTLY
 4748
 4749
 4750                          ;*****************************************************************************
 4751                          ;
 4752                          ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE SUB
 4753                          ;AND SBC INSTRUCTIONS.  BOTH OF THESE INSTRUCTIONS HANDLE THE
 4754                          ;C AND V BITS IDENTICALLY.  THE PROCEDURE IS TO PRESET THE CONDITION
 4755                          ;CODES, EXECUTE THE INSTRUCTION WITH A PARTICULAR SET OF DATA, AND
 4756                          ;THEN CHECK THE RESULTS BY EXECUTING A SERIES OF CONDITIONAL
 4757                          ;BRANCHES.  THIS PROCEDURE IS REPEATED SEVERAL TIMES WITH DIFFERENT
 4758                          ;DATA PATTERNS TO PROVIDE EVERY COMBINATION OF THE C AND V BITS.
 4759                          ;
 4760                          ;*****************************************************************************
 4761                          ;TEST 225       TEST SUB INSTRUCTION
 4762                          ;*****************************************************************************
 4763  014714                        TS225:
 4764  014714  012700  125252                MOV     #125252,R0
 4765  014720  000257                        CCC                     ;CC=1010
 4766  014722  000271                        +SEN!SEC
 4767  014724  162700  125252                SUB     #125252,R0      ;CC=0101   R0=0
 4768  014730  101002                        BHI     SUB1
 4769  014732  102401                        BVS     SUB1
 4770  014734  100001                        BPL     SUB2
 4771  014736                        SUB1:
 4772  014736  104000                        EMT                     ;SUB DID NOT SET CC'S CORRECTLY
 4773  014740  052700  100000        SUB2:   BIS     #100000,R0
 4774  014744  000277                        SCC                     ;CC=1101
 4775  014746  000242                        CLV
 4776  014750  162700  077777                SUB     #77777,R0       ;CC=0010   R0=1
```

```
 4777  014754  101402                BLOS    SUB3
 4778  014756  102001                BVC     SUB3
 4779  014760  100001                BPL     SUB4
 4780  014762                    SUB3:
 4781  014762  104000                EMT                     ;
 4782  014764  005100            SUB4:COM     R0              ;R0=177777
 4783  014766  000277                SCC                     ;CC=11111
 4784
 4785  014770  162700  100000        SUB     #100000,R0      ;CC=0000   R0=77777
 4786  014774  101402                BLOS    SUB5
 4787  014776  102401                BVS     SUB5
 4788  015000  100001                BPL     SUB6
 4789  015002                    SUB5:
 4790  015002  104000                EMT                     ;SUB DID NOT SET CC'S CORRECTLY
 4791  015004  000257            SUB6:CCC                    ;CC=0100
 4792  015006  000264                SEZ
 4793  015010  162700  140000        SUB     #140000,R0      ;CC=1011
 4794  015014  102003                BVC     SUB7
 4795  015016  103002                BCC     SUB7
 4796  015020  001401                BEQ     SUB7
 4797  015022  100401                BMI     TS226
 4798  015024                    SUB7:
 4799  015024  104000                EMT                     ;
 4800
 4801                        ;*********************************************************************************
 4802                        ;TEST 226       TEST SBC INSTRUCTION
 4803                        ;*********************************************************************************
 4804  015026                TS226:
 4805  015026  012700  000001        MOV     #1,R0
 4806  015032  000277                SCC                     ;CC=1011
 4807  015034  000244                CLZ
 4808  015036  005600                SBC     R0              ;CC=0100   R=0
 4809  015040  103403                BCS     SBC1
 4810  015042  102402                BVS     SBC1
 4811  015044  100401                BMI     SBC1
 4812  015046  001401                BEQ     SBC2
 4813  015050                    SBC1:
 4814  015050  104000                EMT                     ;SBC DID NOT SET CC'S CORRECTLY
 4815  015052  000277            SBC2:SCC                    ;CC=1010
 4816  015054  000245                +CLZ!CLC
 4817  015056  005600                SBC     R0              ;CC=0100   R=0
 4818  015060  103403                BCS     SBC3
 4819  015062  102402                BVS     SBC3
 4820  015064  100401                BMI     SBC3
 4821  015066  001401                BEQ     SBC4
 4822  015070                    SBC3:
 4823  015070  104000                EMT                     ;SBC DID NOT SET CC'S CORRECTLY
 4824  015072  000277            SBC4:SCC                    ;CC=0111
 4825  015074  000250                CLN
 4826  015076  005600                SBC     R0              ;CC=1001   R0=177777
 4827  015100  103003                BCC     SBC5
 4828  015102  102402                BVS     SBC5
 4829  015104  001401                BEQ     SBC5
 4830  015106  100401                BMI     SBC6
 4831  015110                    SBC5:
 4832  015110  104000                EMT                     ;SBC DID NOT SET CC'S CORRECTLY
```

```
 4833  015112  042700  077777          SBC6:   BIC     #77777,R0       ;R0=100000
 4834  015116  000277                          SCC                     ;CC=1101
 4835  015120  000242                          CLV
 4836  015122  005600                          SBC     R0              ;CC=0010
 4837  015124  101402                          BLOS    SBC7
 4838  015126  102001                          BVC     SBC7
 4839  015130  100001                          BPL     TS227
 4840  015132                          SBC7:
 4841  015132  104000                          EMT                     ;SBC DID NOT SET CC'S CORRECTLY
 4842
 4843                                  ;*****************************************************************************
 4844                                  ;
 4845                                  ;       THESE NEXT FOUR TESTS VERIFY THE FUNCTIONING OF THE ROL,
 4846                                  ;ROR, ASL AND ASR INSTRUCTIONS.  SPECIAL DATA PATTERNS ARE LOADED
 4847                                  ;AND ROTATED SEVERAL TIMES FOR EACH TEST.  THE CONDITION CODES
 4848                                  ;ARE PRESET BEFORE EACH ROTATION AND THE CONDITION CODES ARE
 4849                                  ;CHECKED AFTER EACH ROTATION.  THE FINAL CHECK IN EACH TEST IS
 4850                                  ;TO VERIFY THE COMMULATIVE DATA RESULT.  THE DATA PATTERNS HAVE
 4851                                  ;BEEN SELECTED TO PRODUCE ALL COMBINATIONS OF THE C AND V BITS.
 4852                                  ;
 4853                                  ;*****************************************************************************
 4854                                  ;TEST 227       TEST ROL INSTRUCTION
 4855                                  ;*****************************************************************************
 4856  015134                          TS227:
 4857  015134  012700  144000                  MOV     #144000,R0      ;R0=144000
 4858  015140  000257                          CCC                     ;CC=0110
 4859  015142  000266                          +SEZ!SEV
 4860  015144  006100                          ROL     R0              ;CC=1001   R0=110000
 4861  015146  103003                          BCC     ROL1
 4862  015150  102402                          BVS     ROL1
 4863  015152  001401                          BEQ     ROL1
 4864  015154  100401                          BMI     ROL2
 4865  015156                          ROL1:
 4866  015156  104000                          EMT                     ;
 4867  015160  000277                  ROL2:   SCC                     ;CC=1100
 4868  015162  000243                          +CLV!CLC
 4869  015164  006100                          ROL     R0              ;CC=0011   R0=020000
 4870  015166  103003                          BCC     ROL3
 4871  015170  102002                          BVC     ROL3
 4872  015172  001401                          BEQ     ROL3
 4873  015174  100001                          BPL     ROL4
 4874  015176                          ROL3:
 4875  015176  104000                          EMT                     ;ROL DID NOT SET CC'S CORRECTLY
 4876  015200  000277                  ROL4:   SCC                     ;CC=0111
 4877  015202  000250                          CLN
 4878  015204  006100                          ROL     R0              ;CC=0000   R0=040001
 4879  015206  101402                          BLOS    ROL5
 4880  015210  102401                          BVS     ROL5
 4881  015212  100001                          BPL     ROL6
 4882  015214                          ROL5:
 4883  015214  104000                          EMT                     ;ROL DID NOT SET CC'S CORRECTLY
 4884  015216  000257                  ROL6:   CCC                     ;CC=0101
 4885  015220  000265                          +SEZ!SEC
 4886  015222  006100                          ROL     R0              ;CC=1010   R0=100003
 4887  015224  101405                          BLOS    ROL7
 4888  015226  102004                          BVC     ROL7
```

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 4889  015230  100003
 4890  015232  022700  100003          BPL     ROL7
 4891  015236  001401                  CMP     #100003,R0
 4892  015240                          BEQ     TS230
 4893  015240  104000          ROL7:
 4894                                  EMT                     ;ROL MALFUNCTIONED
 4895                          ;*****************************************************************************
 4896                          ;TEST 230       TEST ROR INSTRUCTION
 4897  015242                  ;*****************************************************************************
 4898  015242  012700  000023  TS230:
 4899  015246  000277                  MOV     #23,R0          ;R0=23
 4900  015250  000250                  SCC                     ;CC=0111
 4901  015252  006000                  CLN
 4902  015254  102403                  ROR     R0              ;CC=1001    R0=100011
 4903  015256  103002                  BVS     ROR1
 4904  015260  001401                  BCC     ROR1
 4905  015262  100401                  BEQ     ROR1
 4906  015264                          BMI     ROR2
 4907  015264  104000          ROR1:
 4908  015266  000257                  EMT                     ;ROR DID NOT SET CC'S CORRECTLY
 4909  015270  000274          ROR2:   CCC                     ;CC=1100
 4910  015272  006000                  +SEN!SEZ
 4911  015274  102003                  ROR     R0              ;CC=0011    R0=040004
 4912  015276  103002                  BVC     ROR3
 4913  015300  001401                  BCC     ROR3
 4914  015302  100001                  BEQ     ROR3
 4915  015304                          BPL     ROR4
 4916  015304  104000          ROR3:
 4917  015306  000277                  EMT                     ;ROR DID NOT SET CC'S CORRECTLY
 4918  015310  000241          ROR4:   SCC                     ;CC=1110
 4919  015312  006000                  CLC
 4920  015314  101403                  ROR     R0              ;CC=0000    R0=020002
 4921  015316  102402                  BLOS    ROR5
 4922  015320  001401                  BVS     ROR5
 4923  015322  100001                  BEQ     ROR5
 4924  015324                          BPL     ROR6
 4925  015324  104000          ROR5:
 4926  015326  000257                  EMT                     ;ROR DID NOT SET CC'S CORRECTLY
 4927  015330  000265          ROR6:   CCC                     ;CC=0101
 4928  015332  006000                  +SEC!SEZ
 4929  015334  101402                  ROR     R0              ;CC=1010    R0=110001
 4930  015336  102001                  BLOS    ROR7
 4931  015340  100401                  BVC     ROR7
 4932  015342                          BMI     TS231
 4933  015342  104000          ROR7:
 4934                                  EMT                     ;ROR DID NOT PRODUCE CORRECT RESULTS
 4935                          ;*****************************************************************************
 4936                          ;TEST 231       TEST ASL INSTRUCTION
 4937  015344                  ;*****************************************************************************
 4938  015344  012700  144000  TS231:
 4939  015350  000257                  MOV     #144000,R0      ;R0=14000
 4940  015352  000271                  CCC                     ;CC=0110
 4941  015354  006300                  +SEN!SEC
 4942  015356  103003                  ASL     R0              ;CC=1001    R0=110000
 4943  015360  102402                  BCC     ASL1
 4944  015362  001401                  BVS     ASL1
                                       BEQ     ASL1
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 4945  015364  100401                  BMI     ASL2
 4946  015366                  ASL1:
 4947  015366  104000                  EMT                     ;
 4948  015370  000277          ASL2:   SCC                     ;CC=1100
 4949  015372  000243                  +CLV!CLC
 4950  015374  006300                  ASL     R0              ;CC=0011   R0=020000
 4951  015376  103003                  BCC     ASL3
 4952  015400  102002                  BVC     ASL3
 4953  015402  001401                  BEQ     ASL3
 4954  015404  100001                  BPL     ASL4
 4955  015406                  ASL3:
 4956  015406  104000                  EMT                     ;ASL DID NOT SET CC'S CORRECTLY
 4957  015410  000277          ASL4:   SCC                     ;CC=0111
 4958  015412  000250                  CLN
 4959  015414  006300                  ASL     R0              ;CC=0000   R0=040000
 4960  015416  101402                  BLOS    ASL5
 4961  015420  102401                  BVS     ASL5
 4962  015422  100001                  BPL     ASL6
 4963  015424                  ASL5:
 4964  015424  104000                  EMT                     ;ASL DID NOT SET CC'S CORRECTLY
 4965  015426  000257          ASL6:   CCC                     ;CC=0101
 4966  015430  000265                  +SEZ!SEC
 4967  015432  006300                  ASL     R0              ;CC=1010   R0=100000
 4968  015434  103406                  BCS     ASL7
 4969  015436  001405                  BEQ     ASL7
 4970  015440  102004                  BVC     ASL7
 4971  015442  100003                  BPL     ASL7
 4972  015444  022700  100000          CMP     #100000,R0
 4973  015450  001401                  BEQ     TS232
 4974  015452                  ASL7:
 4975  015452  104000                  EMT                     ;ASL MALFUNCTIONED
 4976                          ;*******************************************************************************
 4977                          ;TEST 232       TEST ASR INSTRUCTION
 4978                          ;*******************************************************************************
 4979  015454                  TS232:
 4980  015454  012700  100023          MOV     #100023,R0      ;R0=100023
 4981  015460  000277                  SCC                     ;CC=0110
 4982  015462  000250                  CLN
 4983  015464  006200                  ASR     R0              ;CC=1001   RP=140011
 4984  015466  102403                  BVS     ASR1
 4985  015470  103002                  BCC     ASR1
 4986  015472  001401                  BEQ     ASR1
 4987  015474  100401                  BMI     ASR2
 4988  015476                  ASR1:
 4989  015476  104000                  EMT                     ;ASR DID NOT SET CC'S CORRECTLY
 4990  015500  042700  100000  ASR2:   BIC     #100000,R0      ;R0=40011
 4991  015504  000277                  SCC                     ;CC=1100
 4992  015506  000243                  +CLV!CLC
 4993  015510  006200                  ASR     R0              ;CC=0011   R0=020004
 4994  015512  102003                  BVC     ASR3
 4995  015514  103002                  BCC     ASR3
 4996  015516  001401                  BEQ     ASR3
 4997  015520  100001                  BPL     ASR4
 4998  015522                  ASR3:
 4999  015522  104000                  EMT                     ;ASR DID NOT SET CC'S CORRECTLY
 5000  015524  000277          ASR4:   SCC                     ;CC=1111
```

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5001
5002  015526  006200                  ASR     R0              ;CC=0000   R0=010002
5003  015530  101403                  BLOS    ASR5
5004  015532  102402                  BVS     ASR5
5005  015534  001401                  BEQ     ASR5
5006  015536  100001                  BPL     ASR6
5007  015540                  ASR5:
5008  015540  104000                  EMT                     ;ASR DID NOT SET CC'S CORRECTLY
5009  015542  052700  100000  ASR6:   BIS     #100000,R0      ;R0=110002
5010  015546  000257                  CCC                     ;CC=0101
5011  015550  000265                  +SEZ!SEC
5012  015552  006200                  ASR     R0              ;C=1010   R0=144001
5013  015554  101406                  BLOS    ASR7
5014  015556  102005                  BVC     ASR7
5015  015560  100004                  BPL     ASR7
5016  015562  001403                  BEQ     ASR7
5017  015564  022700  144001          CMP     #144001,R0      ;CHECK RESULT OF ASR'S
5018  015570  001401                  BEQ     TS233
5019  015572                  ASR7:
5020  015572  104000                  EMT                     ;ASR DID NOT FUNCTION CORRECTLY
5021
5022
5023                          ;*****************************************************************************
5024                          ;TEST 233       TEST RORB INSTRUCTION
5025                          ;*****************************************************************************
5026  015574                  TS233:
5027  015574  112701  000004          MOVB    #4,R1   ;LOAD REGISTER
5028  015600  000257                  CCC                     ;CLEAR ALL FLAGS
5029  015602  106001                  RORB    R1              ;SHIFT  BYTE RIGHT
5030  015604  106001                  RORB    R1              ;SHIFT BYTE RIGHT
5031  015606  122701  000001          CMPB    #1,R1           ;CHECK RESULT
5032  015612  001401                  BEQ     RORB1
5033  015614  104000                  EMT                     ;RORB DID NOT FUNCTION CORRECTLY
5034  015616  106001          RORB1:  RORB    R1              ;SHIFT BYTE RIGHT
5035  015620  100403                  BMI     RORB2           ;CC=7?
5036  015622  001002                  BNE     RORB2
5037  015624  102001                  BVC     RORB2
5038  015626  103401                  BCS     RORB3
5039  015630                  RORB2:
5040  015630  104000                  EMT                     ;RORB DID NOT SET CC'S CORRECTLY
5041  015632  106001          RORB3:  RORB    R1              ;SHIFT BYTE RIGHT
5042  015634  100002                  BPL     RORB4           ;CC=12
5043  015636  101401                  BLOS    RORB4
5044  015640  102401                  BVS     RORB5
5045  015642                  RORB4:
5046  015642  104000                  EMT                     ;RORB DID NOT SET CC CORRECTLY
5047  015644  122701  000200  RORB5:  CMPB    #200,R1         ;CHECK RESULT
5048  015650  001401                  BEQ     RORB7
5049  015652  104000                  EMT                     ;RORB DID NOT FUNCTION CORRECTLY
5050  015654                  RORB7:
5051                          ;ROTATE ODD BYTE
5052  015654  005000                  CLR     R0              ;MAKE R0 ZERO
5053  015656  012710  025125          MOV     #025125,(R0)    ;PUT STARTING VALUE IN LOC. 0
5054  015662  005200                  INC     R0              ;MAKE R0 POINT TO ODD BYTE
5055  015664  000257                  CCC                     ;CLEAR ALL CC
5056  015666  000261                  SEC                     ;SEC CARRY BIT
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```
5057  015670  106010                  RORB    (R0)            ;SHIFT BYTE RIGHT
5058  015672  100002                  BPL     RORB10          ;CC=12?
5059  015674  101401                  BLOS    RORB10
5060  015676  102401                  BVS     RORB11
5061  015700                  RORB10:
5062  015700  104000                  EMT                     ;RORB DID NOT SET CC'S CORRECTLY
5063  015702  022737  112525  000000 RORB11: CMP     #112525,@#0     ;CHECK RESULT
5064  015710  001401                  BEQ     RORB12
5065  015712  104000                  EMT                     ;RORB DID NOT FUNCTION CORRECTLY
5066  015714  106010          RORB12: RORB    (R0)            ;SHIFT BYTE RIGHT
5067  015716  100403                  BMI     RORB13          ;CC=3?
5068  015720  001402                  BEQ     RORB13
5069  015722  102001                  BVC     RORB13
5070  015724  103401                  BCS     RORB14
5071  015726                  RORB13:
5072  015726  104000                  EMT                     ;RORB DID NOT SET CC CORRECTLY
5073  015730  022737  045125  000000 RORB14: CMP     #045125,@#0     ;CHECK RESULT
5074  015736  001401                  BEQ     TS234
5075  015740  104000                  EMT                     ;RORB DID NOT FUNCTION CORRECTLY
5076
5077
5078                          ;*****************************************************************************
5079                          ;TEST 234       TEST ASLB INSTRUCTION
5080                          ;*****************************************************************************
5081  015742                  TS234:
5082  015742  112701  000040          MOVB    #40,R1          ;LOAD REGISTER
5083  015746  000257                  CCC                     ;CLEAR ALL CONDITION CODES
5084  015750  106301                  ASLB    R1              ;SHIFT BYTE LEFT
5085  015752  106301                  ASLB    R1              ;SHIFT BYTE LEFT
5086  015754  100002                  BPL     ASLB2           ;CHECK CC=12
5087  015756  101401                  BLOS    ASLB2
5088  015760  102401                  BVS     ASLB3
5089  015762                  ASLB2:
5090  015762  104000                  EMT                     ;ASLB DID NOT SET CONDITION CODE CORRECTLY
5091  015764  022701  000200 ASLB3:  CMP     #200,R1         ;CHECK RESULT
5092  015770  001401                  BEQ     ASLB1
5093  015772  104000                  EMT                     ;ASLB DID NOT FUNCTION CORRECTLY
5094  015774  106301          ASLB1:  ASLB    R1              ;SHIFT BYTE LEFT
5095  015776  100403                  BMI     ASLB4           ;CHECK CC=7?
5096  016000  001002                  BNE     ASLB4
5097  016002  102001                  BVC     ASLB4
5098  016004  103401                  BCS     TS235
5099  016006                  ASLB4:
5100  016006  104000                  EMT                     ;ASLB   DID NOT SET CC'S CORRECTLY
5101
5102
5103                          ;*****************************************************************************
5104                          ;TEST 235       TEST ASRB INSTRUCTION
5105                          ;*****************************************************************************
5106  016010                  TS235:
5107  016010  112701  000004          MOVB    #4,R1           ;SET UP STARTING DATA
5108  016014  000257                  CCC                     ;CLEAR ALL CONDITION CODES
5109  016016  106201                  ASRB    R1              ;SKIFT BYTE RIGHT
5110  016020  106201                  ASRB    R1              ;SHIFT BYTE RIGHT
5111  016022  122701  000001          CMPB    #1,R1           ;CHECK DATA
5112  016026  001401                  BEQ     ASRB1
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 5113  016030  104000                    EMT                     ;ASRB DID NOT SHIFT DATA CORRECTLY
 5114  016032  106201          ASRB1:    ASRB    R1              ;SHIFT BYTE RIGHT
 5115  016034  100403                    BMI     ASRB2           ;CHECK CONDITION CODE = 7?
 5116  016036  001002                    BNE     ASRB2
 5117  016040  102001                    BVC     ASRB2
 5118  016042  103401                    BCS     ASRB3
 5119  016044                    ASRB2:
 5120  016044  104000                    EMT                     ;ASRB DID NOT SET CC'S CORRECTLY
 5121  016046  106201          ASRB3:    ASRB    R1              ;SHIFT BYTE RIGHT
 5122  016050  103401                    BCS     ASRB4           ;CHECK CC=4
 5123  016052  001401                    BEQ     ASRB5
 5124  016054                    ASRB4:
 5125  016054  104000                    EMT                     ;ASRB DID NOT SET CC'S CORRECTLY
 5126  016056  112701  000202  ASRB5:    MOVB    #202,R1         ;PUT STARTING DATA IN REGISTER
 5127  016062  106201                    ASRB    R1              ;SHIFT BYTE RIGHT
 5128  016064  106201                    ASRB    R1              ;SHIFT BYTE RIGHT
 5129  016066  100003                    BPL     ASRB6           ;CHECK CC'S =11?
 5130  016070  001402                    BEQ     ASRB6
 5131  016072  102401                    BVS     ASRB6
 5132  016074  103401                    BCS     ASRB7
 5133  016076                    ASRB6:
 5134  016076  104000                    EMT                     ;ASRB DID NOT SET CC'S CORRECTLY
 5135  016100  122701  000340  ASRB7:    CMPB    #340,R1         ;CHECK RESULT
 5136  016104  001401                    BEQ     TS236
 5137  016106  104000                    EMT                     ;ASRB DID NOT SHIFT DATA CORRECTLY
 5138
 5139                            ;*******************************************************************************
 5140                            ;
 5141                            ;       THIS TEST VERIFIES THE SXT INSTRUCTION. CONDITION  CODES
 5142                            ;ARE PRESET IN EACH OF THE TWO POSSIBLE CASES. WITH THE N-BIT SET,
 5143                            ;THE TEST CHECKS FOR ALL ONES IN THE DESTINATION. WITH THE N-BIT
 5144                            ;CLEAR, THE DESTINATION SHOULD CONTAIN ALL ZEROES. THE DATA
 5145                            ;IS VERIFIED BY CONDITIONAL BRANCHES.
 5146                            ;
 5147                            ;*******************************************************************************
 5148                            ;TEST 236       TEST THE SXT INSTRUCTION
 5149                            ;*******************************************************************************
 5150  016110                    TS236:
 5151  016110  005000                    CLR     R0
 5152  016112  000277                    SCC                     ;SET CC=1011
 5153  016114  000244                    CLZ
 5154  016116  006700                    SXT     R0              ;TRY SXT
 5155  016120  100006                    BPL     SXT0            ;TEST CC=1001
 5156  016122  001405                    BEQ     SXT0
 5157  016124  102404                    BVS     SXT0
 5158  016126  103003                    BCC     SXT0
 5159  016130  022700  177777           CMP     #-1,R0          ;CHECK DATA RESULT
 5160  016134  001401                    BEQ     SXT1
 5161  016136                    SXT0:
 5162  016136  104000                    EMT                     ;RESULTS OF SXT INCORRECT
 5163  016140  005000            SXT1:   CLR     R0              ;R0=0
 5164  016142  005010                    CLR     (R0)            ;LOC. 0=0
 5165  016144  005110                    COM     (R0)            ;LOC. 0=177777
 5166  016146  000257                    CCC                     ;SET CC=0110
 5167  016150  000266                    +SEZ!SEV
 5168  016152  006710                    SXT     (R0)
```

```
 5169  016154  001005                BNE     SXT2            ;TEST CC=0100
 5170  016156  103404                BCS     SXT2
 5171  016160  102403                BVS     SXT2
 5172  016162  100402                BMI     SXT2
 5173  016164  005710                TST     (R0)
 5174  016166  001401                BEQ     TS237
 5175  016170                    SXT2:
 5176  016170  104000                EMT                     ;RESULTS OF SXT INCORRECT
 5177                            ;*************************************************************************************
 5178                            ;
```

```
5179
5180                                    ;       THIS TEST VERIFIES THE XOR INSTRUCTION. UNIQUE PATTERNS
5181                                    ;OF ONES AND ZEROES ARE MOVED TO DATA REGISTERS R0 AND R1.
5182                                    ;AFTER THE FIRST XOR INSTRUCTION R0=36146. AN XOR IS THEN
5183                                    ;EXECUTED WITH THIS NEW VALUE AND THE CONTENTS OF R1 TO
5184                                    ;REPRODUCE THE ORIGINAL VALUE IF R0=31525.
5185                                    ;
5186                                    ;*****************************************************************************
5187                                    ;TEST 237       TEST THE XOR INSTRUCTION
5188  016172                            ;*****************************************************************************
5189  016172  012700  007463    TS237:  MOV     #7463,R0        ;SET UP R0
5190  016176  012701  031525            MOV     #31525,R1       ;SET UP R1
5191  016202  000277                    SCC                     ;SET CC=1110
5192  016204  000241                    CLC
5193  016206  074100                    XOR     R1,R0           ;TRY XOR
5194  016210  101406                    BLOS    XOR1            ;CC=0000?
5195  016212  102405                    BVS     XOR1
5196  016214  001404                    BEQ     XOR1
5197  016216  100403                    BMI     XOR1
5198  016220  022700  036146          CMP     #36146,R0       ;DATA RESULT CORRECT?
5199  016224  001401                    BEQ     XOR2
5200  016226                    XOR1:
5201  016226  104000                    EMT                     ;
5202  016230  010104            XOR2:   MOV     R1,R4
5203  016232  000261                    SEC                     ;CC=1110
5204  016234  000241                    CLC
5205  016236  074400                    XOR     R4,R0           ;TRY XOR MODE 0,0
5206  016240  101406                    BLOS    XOR3            ;CC=0000?
5207  016242  102405                    BVS     XOR3
5208  016244  001404                    BEQ     XOR3
5209  016246  100403                    BMI     XOR3
5210  016250  022700  007463          CMP     #7463,R0
5211  016254  001401                    BEQ     TS240
5212  016256                    XOR3:
5213  016256  104000                    EMT                     ;RESULT OF XOR INCORRECT
5214                                    ;*****************************************************************************
5215                                    ;
5216                                    ;       THIS TEST VERIFIES THE SOB INSTRUCTION. R4 IS USED AS A
5217                                    ;COUNTER WHILE R0 IS THE ADDRESS REGISTER. CONDITIONAL
5218                                    ;BRANCHES ARE USED TO VERIFY PROPER TRANSFER OF CONTROL
5219                                    ;WHILE R4 IS CHECKED TO INSURE PROPER DECREMENTING OF R0.
5220                                    ;
5221                                    ;*****************************************************************************
5222                                    ;TEST 240       TEST SOB INSTRUCTION
5223                                    ;*****************************************************************************
5224  016260                    TS240:
5225  016260  012700  000525            MOV     #525,R0
5226  016264  010004                    MOV     R0,R4
5227  016266  000277                    SCC                     ;SET CC=1111
5228  016270  101002            SOB1:   BHI     SOB2            ;CC=1111?
5229  016272  100001                    BPL     SOB2
5230  016274  102401                    BVS     SOB3
5231  016276                    SOB2:
5232  016276  104000                    EMT                     ;
5233  016300  005304            SOB3:   DEC     R4              ;COUNT ITERATIONS
5234  016302  000277                    SCC                     ;CC=1111
```

```
 5235  016304  077007                 SOB     R0,SOB1         ;DO SOB W/ R0
 5236  016306  101004                 BHI     SOB4            ;CHECK CC=1111
 5237  016310  100003                 BPL     SOB4
 5238  016312  102002                 BVC     SOB4
 5239  016314  005704                 TST     R4              ;ITERATION COUNT OK?
 5240  016316  001401                 BEQ     TS241
 5241  016320                 SOB4:
 5242  016320  104000                 EMT                     ;INCORRECT # OF BRANCHES OR CC'S CHANGED
 5243                         ;*************************************************************************
 5244                         ;
 5245                         ;       THIS TEST VERIFIES THE MARK INSTRUCTION. THE EFFECTS
 5246                         ;OF THE MARK INSTRUCTION ARE SIMULATED BY THE PROGRAM INSTRUCTIONS.
 5247                         ;THE CONTENTS OF R5 AND THE STACK POINTER ARE CHECKED AFTER EACH
 5248                         ;OF THE TWO ROUTINES IN THE TEST.
 5249                         ;
 5250                         ;*************************************************************************
 5251                         ;TEST 241       TEST MARK INSTRUCTION
 5252                         ;*************************************************************************
 5253  016322                 TS241:
 5254  016322  012706  001000         MOV     #STBOT,SP
 5255  016326  012746  125252         MOV     #125252,-(SP)   ;PUT R5 VALUE ON STACK
 5256  016332  162706  000074         SUB     #74,SP          ;EFFECTIVELY PUT 36 ARGUMENTS ON STACK
 5257  016336  012705  016354         MOV     #MRK1,R5        ;SET NEW PC IN R5
 5258  016342  012746  006436         MOV     #6436,-(SP)     ;PUT MARK 36 INST. ON STACK
 5259  016346  000277                 SCC                     ;SET CC=1111
 5260  016350  000116                 JMP     (SP)            ;XFER CONTL TO MARK 36 INST. ON STACK
 5261  016352  104000                 EMT                     ;MARK INST. SHOULD HAVE JUMPED TO MRK1
 5262  016354  101010         MRK1:   BHI     MRK2            ;TEST CC UNAFFECTED
 5263  016356  100007                 BPL     MRK2            ;IE. CC=1111
 5264  016360  102006                 BVC     MRK2
 5265  016362  020527  125252         CMP     R5,#125252      ;CHECK R5 RESTORED FROM STACK
 5266  016366  001003                 BNE     MRK2
 5267  016370  022706  001000         CMP     #STBOT,R6       ;CHECK STACK POINTER READJUSTED CORRECTLY.
 5268  016374  001401                 BEQ     MRK3
 5269  016376                 MRK2:
 5270  016376  104000                 EMT                     ;RESULTS OF MARK INCORRECT
 5271  016400  012746  052525 MRK3:   MOV     #52525,-(SP)
 5272  016404  012746  006400         MOV     #6400,-(SP)     ;PUT MARK 0 INST. ON STACK
 5273  016410  010605                 MOV     SP,R5           ;SET ADDR. OF MARK INST. IN R5
 5274  016412  004737  016422         JSR     PC,@#MRK4       ;DO JSR
 5275  016416  000137  016426         JMP     @#MRK5          ;
 5276  016422  000205         MRK4:   RTS     R5              ;DO RTS WITH R5 TO MARK INST ON STACK
 5277  016424  104000                 EMT                     ;RTS,MARK SEQUENCE FAILED
 5278  016426  022706  001000 MRK5:   CMP     #STBOT,R6       ;STACK ADJUSTED CORRECTLY
 5279  016432  001003                 BNE     MRK6            ;IF NOT:  BR
 5280  016434  022705  052525         CMP     #52525,R5       ;CHECK IF R5 RESTORED FROM STACK
 5281  016440  001401                 BEQ     TS242
 5282  016442                 MRK6:
 5283  016442  104000                 EMT                     ;RESULTS OF MARK INCORRECT
 5284          177776                 PS=177776
 5285                         ;*************************************************************************
 5286                         ;
 5287                         ;       THESE NEXT SEVEN TESTS VERIFY THE MTPS INSTRUCTION IN ALL
 5288                         ;       MODES. THE PSW IS DEFINED BY AN EQUATE STATEMENT BEFORE THE
 5289                         ;       FIRST MTPS TEST. IN EACH TEST A PATTERN OF ONES AND
 5290                         ;       ZEROES IS SET IN A DATA REGISTER AND MOVED TO THE PSW.
```

```
                                ;       THE DATA IN THE PSW, AND THE DATA REGISTER ADDRESS,
                                ;       ARE CHECKED TO VERIFY PROPER EXECUTION OF THE INSTRUCTION.
                                ;
                                ;*******************************************************************************
                                ;TEST 242       TEST MTPS INSTRUCTION
                                ;*******************************************************************************
016444                          TS242:
016444  012700  000377                  MOV     #377,R0
016450  000257                          CCC
016452  106400                          MTPS    R0
016454  022767  000357  161314          CMP     #357,PS
016462  001401                          BEQ     MTPS1
016464  104000                          EMT                             ;MTPS FAILED
016466  005000                  MTPS1:  CLR     R0
016470  005010                          CLR     (R0)
016472  000277                          SCC                             ;CC=1111
016474  106410                          MTPS    (R0)                    ;TRY MTPS MODE 1
016476  100403                          BMI     MTPS1A                  ;CHECK PS
016500  102402                          BVS     MTPS1A
016502  103401                          BCS     MTPS1A
016504  001001                          BNE     TS243
016506                          MTPS1A:
016506  104000                          EMT                             ;MTPS FAILED
                                ;*******************************************************************************
                                ;TEST 243       TEST MTPS MODE 2
                                ;*******************************************************************************
016510                          TS243:
016510  005000                          CLR     R0                      ;R0=0
016512  012710  177777                  MOV     #-1,(R0)                ;LOC. 0=-1
016516  005037  177776                  CLR     @#PS                    ;PS=0
016522  106420                          MTPS    (R0)+                   ;TRY MTPS W/MODE 2
016524  022737  000357  177776          CMP     #357,@#PS               ;CHECK DATA
016532  001401                          BEQ     MTPS2
016534  104000                          EMT                             ;DEST. DATA INCORRECT
016536  022700  000001          MTPS2:  CMP     #1,R0                   ;CHECK DEST. REGISTER.
016542  001401                          BEQ     TS244
016544  104000                          EMT                             ;DEST REGISTER NOT INCREMENTED BY 1
                                ;*******************************************************************************
                                ;TEST 244       TEST MTPS MODE 3
                                ;*******************************************************************************
016546                          TS244:
016546  012700  000402                  MOV     #402,R0                 ;R0=402
016552  005010                          CLR     (R0)                    ;LOC. 402=0
016554  012737  052652  000000          MOV     #52652,@#0              ;LOC. 0=52652
016562  005037  177776                  CLR     @#PS                    ;PS=0
016566  106430                          MTPS    @(R0)+                  ;TRY MTPS W/MODE 3
016570  022737  000252  177776          CMP     #252,@#PS               ;CHECK DEST. DATA
016576  001401                          BEQ     MTPS3
016600  104000                          EMT                             ;DEST. DATA INCORRECT
016602  022700  000404          MTPS3:  CMP     #404,R0                 ;CHECK MODE 3 REGISTER.
016606  001401                          BEQ     TS245
016610  104000                          EMT                             ;MODE 3 REGISTER INCORRECT
                                ;*******************************************************************************
```

```
                                        ;TEST 245       TEST MTPS MODE 4
                                        ;*****************************************************************************
                                        TS245:
016612                                          MOV     #1,R0           ;R0=1
016612  012700  000001                          MOV     #125125,@#0     ;LOC. 0 = 125125
016616  012737  125125  000000                  CLR     @#PS            ;PS=0
016624  005037  177776                          MTPS    -(R0)           ;TRY MTPS W/MODE 4
016630  106440                                  CMP     #105,@#PS       ;CHECK DEST. DATA
016632  022737  000105  177776                  BEQ     MTPS4
016640  001401                                  EMT                     ;DEST. DATA INCORRECT
016642  104000                          MTPS4:  TST     R0              ;CHECK MODE 4 REGISTER
016644  005700                                  BEQ     TS246
016646  001401                                  EMT                     ;MODE 4 REGISTER NOT DECREMENTED BY 1
016650  104000
                                        ;*****************************************************************************
                                        ;TEST 246       TEST MTPS MODE 5
                                        ;*****************************************************************************
016652                                  TS246:
016652  012700  000404                          MOV     #404,R0         ;R0=404
016656  012737  177400  000000                  MOV     #177400,@#0     ;LOC. 0=177400
016664  000277                                  SCC                     ;SET ALL COND. CODES
016666  106450                                  MTPS    @-(R0)          ;TRY MTPS W/MODE 5
016670  005737  177776                          TST     @#PS            ;CHECK DEST. DATA.
016674  001401                                  BEQ     MTPS5
016676  104000                                  EMT                     ;DESTINATION DATA INCORRECT
016700  022700  000402                  MTPS5:  CMP     #402,R0         ;CHECK MODE 5 REGISTER
016704  001401                                  BEQ     TS247
016706  104000                                  EMT                     ;MODE 5 REGISTER NOT DECREMENTED BY 2
                                        ;*****************************************************************************
                                        ;TEST 247       TEST MTPS MODE 6
                                        ;*****************************************************************************
016710                                  TS247:
016710  012737  052652  000000                  MOV     #52652,@#0      ;LOC. 0=52652
016716  012700  000406                          MOV     #406,R0         ;R0=406
016722  005037  177776                          CLR     @#PS            ;PS=0
016726  106460  177372                          MTPS    -406(R0)        ;TRY MTPS W/MODE 6
016732  022737  000252  177776                  CMP     #252,@#PS       ;CHECK DEST. DATA
016740  001401                                  BEQ     MTPS6
016742  104000                                  EMT                     ;DEST. DATA INCORRECT
016744  022700  000406                  MTPS6:  CMP     #406,R0         ;CHECK MODE 6 REGISTER
016750  001401                                  BEQ     TS250
016752  104000                                  EMT                     ;MODE 6 REGISTER MODIFIED
                                        ;*****************************************************************************
                                        ;TEST 250       TEST MTPS MODE 7
                                        ;*****************************************************************************
016754                                  TS250:
016754  012737  052652  000000                  MOV     #52652,@#0      ;LOC. 0=52652
016762  012700  000410                          MOV     #410,R0         ;R0=410
016766  005037  177776                          CLR     @#PS            ;PS=0
016772  106470  177776                          MTPS    @-2(R0)         ;TRY MTPS W/MODE 7
016776  022737  000105  177776                  CMP     #105,@#PS       ;CHECK DEST. DATA
017004  001401                                  BEQ     MTPS7
017006  104000                                  EMT                     ;DESTINATION DATA INCORRECT
017010  022700  000410                  MTPS7:  CMP     #410,R0         ;CHECK MODE 7 REGISTER
```

```
                                        BEQ     TS251
                                        EMT                     ;MODE 7 REGISTER MODIFIED

                                ;*******************************************************************************
                                ;
                                ;       THESE NEXT SEVEN TESTS VERIFY THE MFPS INSTRUCTION IN ALL
                                ;MODES. IN EACH TEST, A PATTERN OF ONES AND ZEROES IS MOVED TO THE
                                ;PSW, AND AN MFPS INSTRUCTION MOVES THE DATA TO A LOCATION SETUP
                                ;BY R0, EITHER DIRECTLY OR INDIRECTLY. CONDITIONAL BRANCHES ARE
                                ;USED TO CHECK PROPER ADDRESSING AND DATA.
                                ;
                                ;*******************************************************************************
                                ;TEST 251        TEST MFPS INSTRUCTION
                                ;*******************************************************************************
017020                          TS251:
017020  012737  000377  177776        MOV     #377,@#PS
017026  106700                      MFPS    R0
017030  022700  177757              CMP     #177757,R0
017034  001401                      BEQ     MFPS1
017036  104000                      EMT                     ;MFPS FAILED

017040  005000                  MFPS1:  CLR     R0
017042  012737  177777  000000        MOV     #-1,@#0
017050  005037  177776              CLR     @#PS
017054  106710                      MFPS    (R0)
017056  105737  000000              TSTB    @#0
017062  001401                      BEQ     TS252
017064  104000                      EMT                     ;MFPS FAILED

                                ;*******************************************************************************
                                ;TEST 252        TEST MFPS MODE 2
                                ;*******************************************************************************
017066                          TS252:
017066  005000                      CLR     R0              ;R0=0
017070  005010                      CLR     (R0)            ;LOC. 0=0
017072  012737  000377  177776        MOV     #377,@#PS       ;SET PS=357
017100  106720                      MFPS    (R0)+           ;TRY MFPS W/MODE 2
017102  103003                      BCC     MFPS2A          ;BR TO ERROR IF C BIT CLEAR
017104  102402                      BVS     MFPS2A          ;BR TO ERROR IF V BIT SET
017106  001401                      BEQ     MFPS2A          ;BR TO ERROR IF Z BIT SET
017110  100401                      BMI     MFPS2B
017112                          MFPS2A:
017112  104000                      EMT                     ;COND. CODES INCORRECT
017114  022737  000357  000000  MFPS2B: CMP     #357,@#0        ;CHECK DEST. DATA
017122  001401                      BEQ     MFPS2C
017124  104000                      EMT                     ;DEST. DATA INCORRECT
017126  022700  000001          MFPS2C: CMP     #1,R0           ;CHECK MODE 2 REGISTER
017132  001401                      BEQ     TS253
017134  104000                      EMT                     ;MODE 2 REGISTER NOT INCREMENTED 1

                                ;*******************************************************************************
                                ;TEST 253        TEST MFPS MODE 3
                                ;*******************************************************************************
017136                          TS253:
017136  012700  000406              MOV     #406,R0         ;R0=406
017142  005037  000000              CLR     @#0             ;LOC. 0=0
```

```
5459  017146  012737  000252  177776          MOV     #252,@#PS       ;PS=252
5460  017154  106730                          MFPS    @(R0)+          ;TRY MFPS WITH MODE 3
5461  017156  103403                          BCS     MFPS3A          ;BR TO ERROR IF C-BIT SET
5462  017160  102402                          BVS     MFPS3A          ;BR TO ERROR IF V-BIT SET
5463  017162  001401                          BEQ     MFPS3A          ;BR TO ERROR IF Z-BIT SET
5464  017164  100401                          BMI     MFPS3B
5465  017166                          MFPS3A:
5466  017166  104000                          EMT                     ;CONDITION CODES INCORRECT
5467  017170  022737  125000  000000  MFPS3B: CMP     #125000,@#0     ;CHECK DEST. DATA
5468  017176  001401                          BEQ     MFPS3C
5469  017200  104000                          EMT                     ;DEST DATA INCORRECT
5470  017202  020027  000410          MFPS3C: CMP     R0,#410         ;CHECK MODE 3 REGISTER.
5471  017206  001401                          BEQ     TS254
5472  017210  104000                          EMT                     ;MODE 3 REGISTER NOT INCREMENTED BY 2
5473
5474                                  ;*******************************************************************************
5475                                  ;TEST 254       TEST MFPS MODE 4
5476                                  ;*******************************************************************************
5477  017212                          TS254:
5478  017212  012700  000002                  MOV     #2,R0           ;R0=2
5479  017216  005037  000000                  CLR     @#0             ;LOC. 0=0
5480  017222  012737  000125  177776          MOV     #125,@#PS       ;PS=125
5481  017230  106740                          MFPS    -(R0)           ;TRY MFPS W/MODE 4
5482  017232  103003                          BCC     MFPS4A          ;BR TO ERROR IF C-BIT CLEAR
5483  017234  102402                          BVS     MFPS4A          ;BR TO ERROR IF V-BIT SET
5484  017236  001401                          BEQ     MFPS4A          ;BR TO ERROR IF Z-BIT SET
5485  017240  100001                          BPL     MFPS4B
5486  017242                          MFPS4A:
5487  017242  104000                          EMT                     ;COND. CODES INCORRECT
5488  017244  022737  042400  000000  MFPS4B: CMP     #42400,@#0      ;CHECK DEST. DATA
5489  017252  001401                          BEQ     MFPS4C
5490  017254  104000                          EMT                     ;DEST. DATA INCORRECT
5491  017256  020027  000001          MFPS4C: CMP     R0,#1           ;CHECK MODE 4 REGISTER
5492  017262  001401                          BEQ     TS255
5493  017264  104000                          EMT                     ;MODE 4 REGISTER NOT DECREMENTED BY 1
5494
5495                                  ;*******************************************************************************
5496                                  ;TEST 255       TEST MFPS MODE 5
5497                                  ;*******************************************************************************
5498  017266                          TS255:
5499  017266  012700  000410                  MOV     #410,R0         ;R0=410
5500  017272  012737  177777  000000          MOV     #-1,@#0         ;LOC. 0=-1
5501  017300  005037  177776                  CLR     @#PS            ;PS=0
5502  017304  106750                          MFPS    @-(R0)          ;TRY MFPS W/MODE 5
5503  017306  103403                          BCS     MFPS5A          ;BR TO ERROR IF C-BIT SET
5504  017310  102402                          BVS     MFPS5A          ;BR TO ERROR IF V-BIT SET
5505  017312  100401                          BMI     MFPS5A          ;BR TO ERROR IF N-BIT SET
5506  017314  001401                          BEQ     MFPS5B
5507  017316                          MFPS5A:
5508  017316  104000                          EMT                     ;COND. CODES INCORRECT
5509  017320  022737  000377  000000  MFPS5B: CMP     #377,@#0        ;CHECK DEST. DATA
5510  017326  001401                          BEQ     MFPS5C
5511  017330  104000                          EMT                     ;DEST DATA INCORRECT
5512  017332  020027  000406          MFPS5C: CMP     R0,#406         ;CHECK MODE 5 REGISTER
5513  017336  001401                          BEQ     TS256
5514  017340  104000                          EMT                     ;MODE 5 REGISTER NOT DECREMENTED BY 2
```

```
5515
5516                                    ;*****************************************************************************
5517                                    ;TEST 256       TEST MFPS MODE 6
5518                                    ;*****************************************************************************
5519  017342                            TS256:
5520  017342  012700  000401                   MOV     #401,R0         ;R0=410
5521  017346  005037  000000                   CLR     @#0             ;LOC. 0=0
5522  017352  012737  000252  177776           MOV     #252,@#PS       ;PS=252
5523  017360  106760  177377                   MFPS    -401(R0)        ;TRY MFPS W/MODE 6
5524  017364  102403                           BVS     MFPS6A          ;BR TO ERROR IF V-BIT SET
5525  017366  103402                           BCS     MFPS6A          ;BR TO ERROR IF C-BIT SET
5526  017370  001401                           BEQ     MFPS6A          ;BR TO ERROR IF Z-BIT SET
5527  017372  100401                           BMI     MFPS6B
5528  017374                            MFPS6A:
5529  017374  104000                           EMT                     ;COND. CODES INCORRECT
5530  017376  022737  000252  000000   MFPS6B: CMP     #252,@#0        ;CHECK DEST. DATA
5531  017404  001401                           BEQ     MFPS6C
5532  017406  104000                           EMT                     ;DEST. DATA INCORRECT
5533  017410  022700  000401           MFPS6C: CMP     #401,R0         ;CHECK DEST. REGISTER
5534  017414  001401                           BEQ     TS257
5535  017416  104000                           EMT                     ;DEST. DATA INCORRECT
5536
5537                                    ;*****************************************************************************
5538                                    ;TEST 257       TEST MFPS MODE 7
5539                                    ;*****************************************************************************
5540  017420                            TS257:
5541  017420  012700  000777                   MOV     #777,R0         ;R0=777
5542  017424  005037  000000                   CLR     @#0             ;LOC. 0=0
5543  017430  012737  000125  177776           MOV     #125,@#PS       ;PS=125
5544  017436  106770  177407                   MFPS    @-371(R0)       ;TRY MFPS W/MODE 7
5545  017442  102403                           BVS     MFPS7A          ;BR TO ERROR IF V-BIT SET
5546  017444  103002                           BCC     MFPS7A          ;BR TO ERROR IF C-BIT SET
5547  017446  001401                           BEQ     MFPS7A          ;BR TO ERROR IF Z-BIT SET
5548  017450  100001                           BPL     MFPS7B
5549  017452                            MFPS7A:
5550  017452  104000                           EMT                     ;CONDITION CODE INCORRECT
5551  017454  022737  042400  000000   MFPS7B: CMP     #42400,@#0      ;CHECK DESTINATION DATA
5552  017462  001401                           BEQ     MFPS7C
5553  017464  104000                           EMT                     ;DEST. DATA INCORRECT
5554  017466  022700  000777           MFPS7C: CMP     #777,R0         ;CHECK MODE 7 REGISTER
5555  017472  001401                           BEQ     TS260
5556  017474  104000                           EMT                     ;MODE 7 REGISTER MODIFIED
5557
5558                                    ;*****************************************************************************
5559                                    ;
5560                                    ;       THIS TEST VERIFIES THAT RESET DOES NOT CLEAR THE PSW.
5561                                    ;THE PSW IS LOADED WITH ONES, A RESET IS ISSUED, AND THE
5562                                    ;CONTENTS OF THE PSW ARE CHECKED TO VERIFY THAT THEY HAVE NOT
5563                                    ;CHANGED. THIS TEST IS EXECUTED ONLY ONCE EVERY 240 (DECIMAL)
5564                                    ;ITERATIONS OF PROGRAM.
5565                                    ;
5566                                    ;*****************************************************************************
5567                                    ;TEST 260       TEST THAT RESET DOES NOT CLEAR PSW
5568                                    ;*****************************************************************************
5569  017476                            TS260:
5570  017476  032737  000001  001020           BIT     #1, @#SENV      ;ARE WE RUNNING UNDER APT
```

```
5571  017504  001403                          BEQ     70$             ;IF NO THEN DO TEST
5572  017506  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
5573  017512  001011                          BNE     TS261           ;IF NO THEN SHIP TO NEXT TEST
5574  017514                          70$:
5575  017514  012737  000357  177776          MOV     #357,@#PS               ;MOV ONES TO PSW
5576  017522  000005                          RESET                   ;
5577  017524  022737  000357  177776          CMP     #357,@#PS               ;PSW CORRECT?
5578  017532  001401                          BEQ     TS261
5579  017534  104000                          EMT                     ;RESET ALTERED PSW
5580  017536                          REST:
5581
5582                                  ;*******************************************************************************
5583                                  ;
5584                                  ;       THE FOLLOWING TEST CHECKS THE INDEPENDENT FUNCTIONING OF BASIC
5585                                  ;DATA PATH COMPONENTS WITH USER MODE SET.
5586                                  ;
5587                                  ;*******************************************************************************
5588                                  ;TEST 261       TEST USER MODE R6 CAN HOLD A ONE IN EVERY POSITION
5589                                  ;*******************************************************************************
5590  017536                          TS261:
5591  017536  052767  140000  160232          BIS     #USRM,PS                ;SET USER MODE
5592  017544  012706  000001                  MOV     #1,R6                   ;SET BIT0
5593  017550  000241                          CLC                             ;CLEAR C-BIT
5594  017552  006106                  USP1:   ROL     R6                      ;ROTATE 1 POSITION
5595  017554  103376                          BCC     USP1                    ;BR IF NOT ALL DONE
5596  017556  001404                          BEQ     USP1A                   ;BR IF NO BITS PICKED
5597  017560  042767  140000  160210          BIC     #USRM,PS                ;CLEAR USER MODE
5598  017566  104000                          EMT                     ;USER MODE R6 PICKED A BIT
5599  017570  042767  140000  160200  USP1A:  BIC     #USRM,PS                ;CLEAR USER MODE
5600
5601
5602                                  ;*******************************************************************************
5603                                  ;
5604                                  ;       THIS TEST CHECKS THE INDEPENDENT FUNCTIONING OF THE USER
5605                                  ;AND KERNEL MODE R6'S. R6 IS SETUP AND ADDRESSED IN EACH
5606                                  ;OF THE TWO MODES TO VERIFY THAT THE TWO R6'S ARE INDEPENDENT
5607                                  ;OF EACH OTHER.
5608                                  ;
5609                                  ;*******************************************************************************
5610                                  ;TEST 262       TEST INDEPENDENCE OF USER AND KERNEL MODE R6'S
5611                                  ;*******************************************************************************
5612  017576                          TS262:
5613  017576  052767  140000  160172          BIS     #USRM,PS                ;SET USER MODE
5614  017604  012706  177777                  MOV     #-1,R6                  ;SET USER R6 TO ALL ONES
5615  017610  022706  177777                  CMP     #-1,R6                  ;READ AND CHECK USER R6
5616  017614  001404                          BEQ     USP2                    ;BR IF NO ERROR
5617  017616  042767  140000  160152          BIC     #USRM,PS                ;CLEAR USER MODE
5618  017624  104000                          EMT                     ;USER R6 WILL NOT HOLD ALL ONES
5619  017626  042767  140000  160142  USP2:   BIC     #USRM,PS                ;SET KERNEL MODE
5620  017634  022706  177777                  CMP     #-1,R6                  ;KERNEL MODE R6 ADDR. FROM USER MODE?>>
5621  017640  001001                          BNE     USP3
5622  017642  104000                          EMT                     ;DUAL ADDRESSING ERROR USER/KERNEL R6
5623  017644  005006                  USP3:   CLR     R6                      ;CLEAR KERNEL MODE SP
5624  017646  052767  140000  160122          BIS     #USRM,PS                ;SET USER MODE
5625  017654  022706  177777                  CMP     #-1,R6                  ;CHECK USER R6 NOT ADDR. FROM KERNEL MODE
5626  017660  042767  140000  160110          BIC     #USRM,PS                ;CLEAR USER MODE
```

```
5627  017666  001401                        BEQ     USP4                    ;BR IF NO ERROR
5628  017670  104000                        EMT                     ;DUAL ADDRESSING ERROR OR SEQUENCE ERROR
5629  017672  012706  001000        USP4:   MOV     #STBOT,R6               ;RESTORE SP USER
5630  017676  042767  140000  160072        BIC     #USRM,PS                ;SET KERNEL MODE
5631  017704  012706  001000                MOV     #STBOT,R6               ;RESTORE SP KERNEL
5632
5633                                  ;*****************************************************************************
5634                                  ;
5635                                  ;       THESE NEXT TWO TESTS VERIFY MFPI AND MTPI INSTRUCTIONS
5636                                  ;WITH R6 IN MODE 0.
5637                                  ;
5638                                  ;*****************************************************************************
5639                                  ;TEST 263       TEST MFPI WITH R6 IN MODE 0
5640                                  ;*****************************************************************************
5641  017710                          TS263:
5642  017710  012706  001000                MOV     #STBOT,R6               ;INITIALIZE KERNEL STACK POINTER
5643  017714  012767  140000  160054        MOV     #USRM,PS                ;SET USER MODE.PREVIOUS KERNEL
5644  017722  012706  000600                MOV     #USESTK,R6              ;INITIALIZE USER STACK POINTER
5645  017726  006506                        MFPI    R6                      ;TRY MFPI WITH MODE 0
5646  017730  022767  140000  160040        CMP     #140000,PS              ;CHECK PSW
5647  017736  001404                        BEQ     MFPI0                   ;BR IF NO ERROR
5648  017740  042767  140000  160030        BIC     #USRM,PS                ;CLEAR USER MODE
5649  017746  104000                        EMT                     ;INCORRECT PSW FROM MFPI
5650  017750  042767  140000  160020  MFPI0:  BIC     #USRM,PS                ;CLEAR USER MODE
5651  017756  022767  001000  160612        CMP     #STBOT,USESTK-2         ;CHECK DATA ON STACK
5652  017764  001401                        BEQ     MFPI0A                  ;BR IF NO ERROR
5653  017766  104000                        EMT                     ;INCORRECT DATA FROM MFPI
5654  017770                          MFPI0A:
5655
5656                                  ;*****************************************************************************
5657                                  ;TEST 264       TEST MTPI WITH R6 IN MODE 0
5658                                  ;*****************************************************************************
5659  017770                          TS264:
5660  017770  005067  160002                CLR     PS                      ;SET KERNEL MODE
5661  017774  005006                        CLR     R6                      ;INITIALIZE KERNEL R6
5662  017776  012767  140000  157772        MOV     #USRM,PS                ;SET USER MODE/PREVIOUS KERNEL
5663  020004  012706  000600                MOV     #USESTK,R6              ;INITIALIZE USER STACK POINTER
5664  020010  012746  001000                MOV     #STBOT,-(R6)            ;SET UP TARGET DATA
5665  020014  006606                        MTPI    R6                      ;TRY MODE 0 MTPI
5666  020016  022767  140000  157752        CMP     #USRM,PS                ;CHECK PSW
5667  020024  001404                        BEQ     MTPI0                   ;BR IF NO ERROR
5668  020026  042767  140000  157742        BIC     #USRM,PS                ;CLEAR USER MODE
5669  020034  104000                        EMT                     ;PS INCORRECT FOLLOWING MTPI
5670  020036  005067  157734        MTPI0:  CLR     PS                      ;SET KERNEL MODE
5671  020042  020627  001000                CMP     R6,#STBOT               ;CHECK TARGET DATA
5672  020046  001401                        BEQ     TS265
5673  020050  104000                        EMT                     ;DATA INCORRECT FOLLOWING MTPI
5674
5675
5676
5677                                  ;*****************************************************************************
5678                                  ;
5679                                  ;THE FOLLOWING TEST VERIFIES THAT NO DUAL ADDRESSING OF THE GENERAL
5680                                  ;REGISTERS OCCURS. ALL REGISTERS ARE CLEARED, AND A UNIQUE BIT IS SET
5681                                  ;IN EACH. CMP INSTRUCTIONS CHECK THAT ONLY ONE BIT IS SET IN EACH
5682                                  ;REGISTER.
```

```
                                        ;
                                        ;*****************************************************************************
                                        ;TEST 265       DUAL REGISTER ADDRESSING TEST
                                        ;*****************************************************************************
                                        TS265:
020052                                  BITCLR: CLR     R0              ;INITIALIZE ALL REGISTERS
020052  005000                                  CLR     R1
020054  005001                                  CLR     R2
020056  005002                                  CLR     R3
020060  005003                                  CLR     R4
020062  005004                                  CLR     R5
020064  005005                                  CLR     R6
020066  005006                          BITSET: BIS     #1,R0           ;SET R0=1
020070  052700  000001                          BIS     #2,R1           ;R1=2
020074  052701  000002                          BIS     #4,R2           ;R2=4
020100  052702  000004                          BIS     #10,R3          ;R3=10
020104  052703  000010                          BIS     #20,R4          ;R4=20
020110  052704  000020                          BIS     #40,R5          ;R5=40
020114  052705  000040                          BIS     #100,R6         ;R6=100
020120  052706  000100                  BITCHK: CMP     #100,R6         ;TEST THAT NO DUAL ADDRESSING OCCURRED
020124  022706  000100                          BNE     DAERR           ;BR TO ERROR HALT IF ANY OTHER BITS ARE SET
020130  001022                                  CMP     #40,R5
020132  022705  000040                          BNE     DAERR
020136  001017                                  CMP     #20,R4
020140  022704  000020                          BNE     DAERR
020144  001014                                  CMP     #10,R3
020146  022703  000010                          BNE     DAERR
020152  001011                                  CMP     #4,R2
020154  022702  000004                          BNE     DAERR
020160  001006                                  CMP     #2,R1
020162  022701  000002                          BNE     DAERR
020166  001003                                  CMP     #1,R0
020170  022700  000001                          BEQ     BITCON
020174  001401
020176                                  DAERR:
020176  104000                                  EMT                     ;DUAL ADDRESSING ERROR
020200  012702  001004                  BITCON: MOV     #$TESTN,R2      ;RESTORE POINTER
020202
                                        ;*****************************************************************************
                                        ;       THIS TEST VERIFIES THAT THE UPPER BYTE OF THE PSW IS NOT AFFECTED
                                        ;WHEN THE PRIORITY LEVEL OR CC'S ARE CHANGED. ALL BITS ARE
                                        ;INITIALLY SET IN THE PSW, AND THE LOW BYTE IS CLEARED. A BIT
                                        ;INSTRUCTION VERIFIES THE DATA.
                                        ;
                                        ;*****************************************************************************
                                        ;TEST 266       TEST BYTE INSTRUCTION ON PSW
                                        ;*****************************************************************************
020204                                  TS266:
020204  052737  170357  177776                  BIS     #170357,@#PS    ;SET ALL POSSIBLE BITS IN PSW
020212  105037  177776                          CLRB    @#PS            ;CLR PR LEVEL AND CC'S
020216  013700  177776                          MOV     @#PS,R0         ;COPY CONTENTS OF PSW
020222  032700  170000                          BIT     #170000,R0      ;TEST THAT UPPER BYTE IS UNAFFECTED
020226  001003                                  BNE     BTCON           ;CONTINUE IF OK
020230  005037  177776          BTERR:  CLR     @#PS            ;RETURN TO KERNEL MODE
020234  104000                                  EMT                     ;BYTE INSTRUCTION ALTERED PSW
020236  005037  177776          BTCON:  CLR     @#PS            ;RETURN TO KERNEL MODE
```

```
                        ;*****************************************************************************
                        ;
                        ;       THIS TEST VERIFIES THAT A JMP INSTRUCTION DOES NOT ALTER THE
                        ;CONDITION CODES IN THE PSW. THE CC'S ARE PRESET,THE JMP IS
                        ;EXECUTED, AND CONDITIONAL BRANCHES VERIFY THE STATE OF THE CC'S.
                        ;
                        ;*****************************************************************************
                        ;TEST 267       TEST THAT JMP INSTRUCTION DOES NOT AFFECT CONDITION CODES
                        ;*****************************************************************************
020242                  TS267:
020242  000277                  SCC
020244  000252                  +CLN!CLV                ;CC=0101
020246  000167  000000          JMP     JMPT            ;JUMP TO TEST PSW
020252  100403          JMPT:   BMI     JMPERR          ;BR TO ERROR HALT IF N-BIT IS SET
020254  001002                  BNE     JMPERR          ;BR TO ERROR HALT IF Z-BIT IS CLEAR
020256  102401                  BVS     JMPERR          ;BR TO ERROR HALT IF V-BIT IF SET
020260  103401                  BCS     TS270
020262                  JMPERR:
020262  104000                  EMT                     ;JMP INSTRUCTION AFFECTED CC'S
                        ;*****************************************************************************
                        ;
                        ;       THIS TEST VERIFIES THE SET AND CLEAR CONDITION CODE INSTRUCTIONS.
                        ;THE TEST CONSISTS OF TWO ROUTINES, ONE TO TEST ALL CLEAR CC
                        ;INSTRUCTIONS, AND THE SECOND TO TEST ALL SET CC INSTRUCTIONS. ALL
                        ;POSSIBLE COMBINATIONS OF CONDITION CODES ARE TESTED, INCLUDING NOP'S.
                        ;       TO TEST THE CLEAR CC INSTRUCTIONS, ALL CONDITION CODES ARE
                        ;INITIALLY SET. THE INSTRUCTION IS EXECUTED, AND THE PSW IS CHECKED
                        ;TO VERIFY THE PROPER COMBINATION OF CONDITION CODES.
                        ;       TO TEST THE SET CC INSTRUCTIONS, THE CONDITION CODES ARE
                        ;INITIALLY CLEARED, AND ONLY THE REQUIRED BITS ARE SET BY THE SET CC
                        ;INSTRUCTION. THE CONTENTS OF THE PSW ARE CHECKED TO VERIFY THAT
                        ;ONLY THE REQUIRED BITS WERE SET.
                        ;
                        ;*****************************************************************************
                        ;TEST 270       TEST SET CC AND CLEAR CC INSTRUCTIONS
                        ;*****************************************************************************
020264                  TS270:
020264  012767  000240  000024          MOV     #240,CC3        ;INITIALIZE CLR CC INSTRUCTION CODES
020272  012767  000017  000032          MOV     #17,CC2         ;INITIALIZE OCTAL MAP
020300  012767  000261  000074          MOV     #261,SC3        ;INITIALIZE SET CC INSTRUCTION CODES
020306  012767  000001  000102          MOV     #1,SC4          ;INITIALIZE OCTAL MAP
020314  000277                  CLRCD:  SCC                     ;SET ALL CONDITION CODES
020316  000000                  CC3:    0                       ;CONDITION CODE INSTRUCTION
020320  013704  177776                  MOV     @#PS,R4         ;COPY THE PSW
020324  042704  177760                  BIC     #177760,R4      ;ISOLATE CONDITION CODES
020330  022704                          CMP     (PC)+,R4        ;CHECK THAT PROPER CC'S WERE CLEARED
020332  000000                  CC2:    0                       ;OCTAL REPRESENTATION OF CC'S
020334  001401                          BEQ     CON1
020336  104000                          EMT                     ;CLEAR CC INSTRUCTION FAILED
020340  005367  177766          CON1:   DEC     CC2             ;SET NEXT OCTAL MAP OF CC'S
020344  005267  177746                  INC     CC3             ;GET NEXT CLEAR CC INSTRUCTION
020350  026727  177742  000257          CMP     CC3,#257        ;TEST FOR CCC INSTRUCTION
020356  003756                          BLE     CLRCD           ;GO TEST NEXT INSTRUCTION IF NOT FOUND
020360  026727  177732  000260          CMP     CC3,#260        ;CHECK FOR NOP=260
020366  001004                          BNE     SETCD           ;GO TEST SET CC INSTRUCTIONS
020370  012767  000017  177734          MOV     #17,CC2         ;SET OCTAL MAP TO TEST NOP
```

```
 5795  020376  000746                          BR      CLRCD           ;GO TEST NOP
 5796  020400  000257                  SETCD:  CCC                     ;CLEAR ALL CONDITION CODES
 5797  020402  000000                  SC3:    0                       ;CONDITION CODE INSTRUCTION
 5798  020404  013704  177776                  MOV     @#PS,R4         ;COY PSW
 5799  020410  042704  177760                  BIC     #177760,R4      ;CLEAR AWAY UNWANTED BITS
 5800  020414  022704                          CMP     (PC)+,R4        ;CHECK THAT PROPER CC'S WERE SET
 5801  020416  000000                  SC4:    0                       ;OCTAL REPRESENTATION OF CC'S
 5802  020420  001401                          BEQ     CON2
 5803  020422                          CCERR:
 5804  020422  104000                          EMT                     ;SET CC FAILED OR SEQUENCE ERROR
 5805  020424  005267  177766          CON2:   INC     SC4             ;SET NEXT OCTAL MAP
 5806  020430  005267  177746                  INC     SC3             ;PREPARE NEXT SET CC INSTRUCTION
 5807  020434  026727  177742  000277          CMP     SC3,#277        ;FINISHED?
 5808  020442  003756                          BLE     SETCD           ;BR IF NO
 5809  020444  000167  000006                  JMP     MOR0            ;JUMP TO NEXT TESTS
```

```
                        ;*****************************************************************************
                        .SBTTL  TEST INSTRUCTIONS USING SAME REGISTER FOR SOURCE & DESTINATION
                        ;
                        ;IN AUTO INCREMENT (DECREMENT) MODES AND
                        ;AUTO INCREMENT (DECREMENT) DEFERRED MODES,
                        ;CONTENTS OF THE REGISTER IN USED ARE
                        ;INCREMENTED (DECREMENTED) BY 2
                        ;BEFORE USED AS THE SOURCE OPERAND.
                        ;
020450  000000  000000  000000  A:      .WORD 0,0,0
020456                  MOR0:
                        ;*****************************************************************************
                        ;TEST 271       TEST AUTO-INCREMENT MODE, USING R0
                        ;*****************************************************************************
020456                  TS271:
020456  005037  020450          CLR     @#A             ;CLEAR LOC A
020462  012700  020450          MOV     #A,R0           ;R0 STORES ADDR OF A
020466  060020                  ADD     R0,(R0)+        ;CHECK THAT R0 IS INCR BY 2 BEFORE
                                                        ;BEING USED AS THE SOURCE OPERAND
020470  022700  020452          CMP     #A+2,R0         ;R0 INCR BY 2?
020474  001401                  BEQ     MOR1
020476  104000                  EMT                     ;R0 WAS NOT INCREMENTED BY 2
                                                        ;
020500  022737  020452  020450  MOR1:   CMP     #A+2,@#A        ;CHECK CONTENT OF R0 WAS INCR BY 2 BEFORE
                                                        ;BEING USED IN THE "ADD" INSTR
                                                        ;LOC A CONTAINS (A+2)?
020506  001401                  BEQ     TS272
020510  104000                  EMT                     ;WRONG SUM IN LOC A
                        ;*****************************************************************************
                        ;TEST 272       AUTO-DECREMENT MODE, USING R0
                        ;*****************************************************************************
020512                  TS272:
020512  005037  020450          CLR     @#A             ;CLEAR LOC A
020516  012700  020452          MOV     #A+2,R0         ;R0 STORES ADDR OF A+2
020522  060040                  ADD     R0,-(R0)        ;CHECK THAT R0 IS DECR BY 2 BEFORE
                                                        ;BEING USED AS THE SOURCE OPERAND
020524  022700  020450          CMP     #A,R0           ;R0 DECR BY 2?
020530  001401                  BEQ     MOR2
020532  104000                  EMT                     ;R0 WAS NOT DECREMENTED BY 2
                                                        ;
020534  022737  020450  020450  MOR2:   CMP     #A,@#A          ;CONTENT OF R0 WAS DECR BY 2 BEFORE
                                                        ;BEING USED IN THE "ADD" INSTR
                                                        ;LOC A CONTAINS (R0)
020542  001401                  BEQ     TS273
020544  104000                  EMT                     ;WRONG SUM IN LOC A
                                                        ;
                        ;*****************************************************************************
                        ;TEST 273       TEST AUTO-INCREMENT DEFERRED MODE, USING R0
                        ;*****************************************************************************
020546                  TS273:
020546  005037  020450          CLR     @#A             ;CLEAR LOC A
020552  005037  020454          CLR     @#A+4           ;CLEAR LOC A+4
020556  012737  020450  020452  MOV     #A,@#A+2        ;STORE ADDR A IN LOC A+2
020564  012700  020452          MOV     #A+2,R0         ;R0 STORES ADDR A+2
020570  060030                  ADD     R0,@(R0)+       ;CHECK THAT R0 IS INCR BY 2 BEFORE
```

```
5866
5867  020572  022700  020454            CMP     #A+4,R0         ;BEING USED AS THE SOURCE OPERAND
5868  020576  001401                    BEQ     MOR3            ;R0 INCR BY 2?
5869  020600  104000                    EMT                     ;R0 WAS NOT INCREMENTED BY 2
5870                                                            ;
5871  020602  022737  020450  020452 MOR3:  CMP     #A,@#A+2        ;LOC A+2 STILL STORES ADDR A?
5872  020610  001401                    BEQ     MOR4
5873  020612  104000                    EMT                     ;LOC A+2 STORES WRONG DATA
5874                                                            ;
5875  020614  022737  020454  020450 MOR4:  CMP     #A+4,@#A        ;CHECK CONTENT OF R0 WAS INCR BY 2 BEFORE
5876                                                            ;BEING USED IN THE "ADD" INSTR
5877  020622  001401                    BEQ     MOR5
5878  020624  104000                    EMT                     ;LOC A STORES WRONG DATA
5879                                                            ;
5880  020626  005737  020454        MOR5:  TST     @#A+4           ;LOC A+4 STILL STORES 0?
5881  020632  001401                    BEQ     TS274
5882  020634  104000                    EMT                     ;LOC A+4 DID NOT STAY CLEAR
5883
5884                                ;*****************************************************************************
5885                                ;TEST 274       TEST AUTO-DECREMENT DEFERRED, USING R0
5886                                ;*****************************************************************************
5887  020636                        TS274:
5888  020636  005037  020450            CLR     @#A             ;CLEAR LOC A
5889  020642  005037  020454            CLR     @#A+4           ;CLEAR LOC A+4
5890  020646  012700  020454            MOV     #A+4,R0         ;R0 STORES ADDR A+4
5891  020652  012737  020450  020452    MOV     #A,@#A+2        ;STORE ADDR A IN LOC A+2
5892  020660  060050                    ADD     R0,@-(R0)       ;CHECK THAT R0 IS DECR BY 2 BEFORE
5893                                                            ;BEING USED AS THE SOURCE OPERAND
5894  020662  022700  020452            CMP     #A+2,R0         ;R0 DECREMENTED BY 2?
5895  020666  001401                    BEQ     MOR6
5896  020670  104000                    EMT                     ;R0 WAS NOT DECREMENTED BY 2
5897                                                            ;
5898  020672  022737  020452  020450 MOR6:  CMP     #A+2,@#A        ;CHECK CONTENT OF R0 WAS DECR BY 2 BEFORE
5899                                                            ;BEING USED IN THE "ADD" INSTR
5900  020700  001401                    BEQ     MOR7
5901  020702  104000                    EMT                     ;LOC A STORES WRONG DATA
5902
5903                                                            ;
5904  020704  022737  020450  020452 MOR7:  CMP     #A,@#A+2        ;LOC A+2 STILL STORES A?
5905  020712  001401                    BEQ     MOR8
5906  020714  104000                    EMT                     ;LOC A+2 STORES WRONG DATA
5907                                                            ;
5908  020716  005737  020454        MOR8:  TST     @#A+4           ;LOC A+4 STILL STORES 0?
5909  020722  001401                    BEQ     TS275
5910  020724  104000                    EMT                     ;LOC A+4 DID NOT STAY CLEAR
5911                                                            ;
```

```
                                ;*****************************************************************************
                                .SBTTL  INSTRUCTION USING PC AS SOURCE REGISTER
                                ;
                                ;IN INDEX, INDEX DEFERRED, RELATIVE, AND
                                ;RELATIVE DEFERRED MODES, DESTINATION WILL CONTAIN
                                ;THE PC COUNT OF THE CURRENT INSTRUCTION +4.
                                ;
                                ;*****************************************************************************
                                ;TEST 275        TEST PC AS SOURCE IN MODE 0, USING R0
                                ;*****************************************************************************
020726                          TS275:
020726  012700  177777                  MOV     #-1,R0          ;SET ALL 1 IN R0
020732  010700                PCN01:    MOV     PC,R0           ;STORES PC IN R0
020734  022700  020734                  CMP     #PCN01+2,R0     ;R0 STORES PC+2?
020740  001401                          BEQ     TS276
020742  104000                          EMT                     ;R0 STORED WRONG VALUE

                                ;*****************************************************************************
                                ;TEST 276        TEST PC AS SOURCE IN MODE 6, USING R0
                                ;*****************************************************************************
020744                          TS276:
020744  012700  020450                  MOV #A,R0               ;R0 STORES ADDR A
020750  010760  000004          PCN2:   MOV PC,4(R0)            ;EFFECTIVE ADDR IS A+4
020754  022737  020754  020454          CMP     #PCN2+4,@#A+4   ;LOC A+4 STORES PC+4?
020762  001401                          BEQ     TS277
020764  104000                          EMT                     ;LOC A+4 STORED WRONG VALUE

                                ;*****************************************************************************
                                ;TEST 277        TEST PC AS SOURCE IN MODE 7, USING R0
                                ;*****************************************************************************
020766                          TS277:
020766  012737  020450  020454          MOV     #A,@#A+4        ;LOC A+4 STORES ADDR A
020774  012700  020450                  MOV     #A,R0           ;R0 STORES ADDR A
021000  010770  000004          PCN3:   MOV     PC,@4(R0)       ;EFFECTIVE ADDR IS A
021004  022737  021004  020450          CMP     #PCN3+4,@#A     ;LOC A STORES PC+4?
021012  001401                          BEQ     TS300
021014  104000                          EMT                     ;LOC A STORED WRONG VALUE

                                ;*****************************************************************************
                                ;TEST 300        TEST PC AS SOURCE IN RELATIVE DEFERRED MODE ,USING R0
                                ;*****************************************************************************
021016                          TS300:
021016  012737  020452  020450          MOV     #A+2,@#A        ;LOC A STORES ADDR A+2
021024  010777  177420          PCN4:   MOV     PC,@A           ;EFFECTIVE ADDR IS A+2
021030  022737  021030  020452          CMP     #PCN4+4,@#A+2   ;LOC A+2 STORES PC+4?
021036  001401                          BEQ     TS301
021040  104000                          EMT                     ;LOC A+2 STORED WRONG VALUE

                                ;*****************************************************************************
                                ;TEST 301        TEST PC AS SOURCE IN RELATIVE MODE ,USING R0
                                ;*****************************************************************************
021042                          TS301:
021042  005037  020450                  CLR     @#A             ;CLEAR A
021046  010767  177376          PCN5:   MOV     PC,A            ;EFFECTIVE ADDR IS A
021052  022737  021052  020450          CMP     #PCN5+4,@#A     ;LOC A STORES PC+4?
021060  001401                          BEQ     TS302
```

```
5968  021062  104000                        EMT                     ;LOCATION A STORED WRONG VALUE
5969                                ;*************************************************************************
5970                                ;THIS TESTS THE MOVE FROM PROCESSOR TYPE INSTRUCTION(MFPT)
5971                                ;UPON EXECUTION R0 WILL RECIEVE THE PROCESSOR MODEL CODE
5972                                ;WHICH IS "000003" FOR THE DCF11-AA
5973                                ;*************************************************************************
5974                                ;*************************************************************************
5975                                ;TEST 302       TEST MFPT
5976                                ;*************************************************************************
5977  021064                        TS302:
5978          000007                MFPT=000007
5979  021064  012706  001000                MOV     #STBOT,SP       ;INITIALIZE STACK POINT IN CASE OF TRAP
5980  021070  000007                        MFPT                    ;GET MODEL CODE.IF THIS TRAPS AN ERROR WILL BE REPORTED
5981  021072  022700  000003               CMP     #3,R0           ;CHECK IF CORRECT CODE RETURNED
5982  021076  001401                        BEQ     TS303
5983  021100  104000                        EMT                     ;WRONG CODE RETURNED
5984
5985
5986
5987                                ;*************************************************************************
5988                                .SBTTL  THE NEXT THREE TESTS EXERCISE MASKING ACTION OF MICROCODES.
5989                                ;*************************************************************************
5990                                ;TEST 303       TEST SUB INSTRUCTION, SM=0, DM=2
5991                                ;*************************************************************************
5992  021102                        TS303:
5993  021102  012737  052525  000000        MOV     #052525,@#0     ;SET UP LOC 0
5994  021110  012701  050505                MOV     #050505,R1      ;SET UP R1
5995  021114  005000                        CLR     R0              ;CLEAR R0
5996  021116  160120                        SUB     R1,(R0)+        ;SUBTRACTION, SM=0,DM=2
5997  021120  022737  002020  000000        CMP     #2020,@#0       ;CHECK DIFFERENCE AT LOC 0
5998  021126  001401                        BEQ     TS304
5999  021130  104000                        EMT                     ;WRONG RESULT FROM SUBTRACTION
6000
6001                                ;*************************************************************************
6002                                ;TEST 304       TEST MFPD WITH R0, IN MODE 2
6003                                ;*************************************************************************
6004  021132                        TS304:
6005  021132  012737  052525  000000        MOV     #052525,@#0     ;SET UP LOC 0
6006  021140  005000                        CLR     R0              ;CLEAR R0
6007  021142  012767  170000  156626        MOV     #170000,PS      ;SET USER MODE ON, CURRENT & PREVIOUS
6008  021150  012706  000600                MOV     #USESTK,R6      ;SET USER STACK POINTER
6009  021154  106520                        MFPD    (R0)+           ;MODE 2, MFPD
6010  021156  005067  156614                CLR     PS              ;SET KERNEL MODE
6011  021162  022767  052525  157406        CMP     #052525,USESTK-2        ;CHECK DATA ON STACK
6012  021170  001401                        BEQ     TS305
6013  021172  104000                        EMT                     ;INCORRECT DATA FROM MFPD
6014
6015                                ;*************************************************************************
6016                                ;TEST 305       TEST MTPD WITH R0, IN MODE 2
6017                                ;*************************************************************************
6018  021174                        TS305:
6019  021174  012767  170000  156574        MOV     #170000,PS      ;SET USER MODE ON, CURRENT & PREVIOUS
6020  021202  012706  000600                MOV     #USESTK,R6      ;SET USER STACK POINTER
6021  021206  012746  125252                MOV     #125252,-(R6)   ;PUSH DATA IN USER STACK
6022  021212  012737  000000  000000        MOV     #0,@#0          ;CLEAR LOC 0
6023  021220  005000                        CLR     R0              ;CLEAR R0
```

```
 6024  021222  106620                          MTPD    (R0)+           ;MODE 2, MTPD
 6025  021224  005067  156546                  CLR     PS              ;SET KERNEL MODE
 6026  021230  022737  125252  000000          CMP     #125252,@#0     ;CHECK DATA ON LOC 0
 6027  021236  001463                          BEQ     TESTN1
 6028  021240  104000                          EMT                     ;INCORRECT DATA FROM MTPD
 6029
 6030  021242  000402                BRTAB:    BR      .+6
 6031  021244  001002                          BNE     .+6
 6032  021246  001402                          BEQ     .+6
 6033  021250  002002                          BGE     .+6
 6034  021252  002402                          BLT     .+6
 6035  021254  003002                          BGT     .+6
 6036  021256  003402                          BLE     .+6
 6037  021260  100002                          BPL     .+6
 6038  021262  100402                          BMI     .+6
 6039  021264  101002                          BHI     .+6
 6040  021266  101402                          BLOS    .+6
 6041  021270  102002                          BVC     .+6
 6042  021272  102402                          BVS     .+6
 6043  021274  103002                          BCC     .+6             ;SAME AS BHIS
 6044  021276  103402                          BCS     .+6             ;SAME AS BLO
 6045
 6046          000002                .RADIX    2
 6047  021300  177777                YNTAB:    1111111111111111        ;BR
 6048  021302  170360                          1111000011110000        ;BNE:  Z=0
 6049  021304  007417                          0000111100001111        ;BEQ:  Z=1
 6050  021306  146063                          1100110000110011        ;BGE:  N XOR V =0
 6051  021310  031714                          0011001111001100        ;BLT:  N XOR V =1
 6052  021312  140060                          1100000000110000        ;BGT:  Z+(N XOR V) =0
 6053  021314  037717                          0011111111001111        ;BLE:  Z+(N XOR V) =1
 6054
 6055  021316  177400                          1111111100000000        ;BPL:  N=0
 6056  021320  000377                          0000000011111111        ;BMI:  N=1
 6057  021322  120240                          1010000010100000        ;BHI:  C+Z=0
 6058  021324  057537                          0101111101011111        ;BLOS: C+Z=1
 6059  021326  146314                          1100110011001100        ;BVC:  V=0
 6060  021330  031463                          0011001100110011        ;BVS:  V=1
 6061  021332  125252                          1010101010101010        ;BCC:  C=0
 6062  021334  052525                          0101010101010101        ;BCS:  C=1
 6063          000010                .RADIX    8
 6064
 6065                                ;*****************************************************************************
 6066                                ; THE FOLLOWING ARE SPECIAL CPU TRAP
 6067                                ;HANDLERS TO TRAP AND REPORT SPECIAL TRAPS.
 6068                                ;
 6069                                ;*****************************************************************************
 6070
 6071  021336                        T04:
 6072  021336  104000                          EMT                     ;TRAPPED THRU LOC. 4
 6073  021340                        T010:
 6074  021340  104000                          EMT                     ;TRAPPED THRU LOC. 10
 6075  021342                        T014:
 6076  021342  104000                          EMT                     ;TRAPPED THRU LOC. 14
 6077  021344                        T020:
 6078  021344  104000                          EMT                     ;TRAPPED THRU LOC. 20
 6079  021346                        T030:
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 6080  021346  104000                    EMT                     ;TRAPPED THRU LOC. 30
 6081  021350                    T034:
 6082  021350  104000                    EMT                     ;TRAPPED THRU LOC. 34
 6083  021352                    T0114:
 6084  021352  104000                    EMT                     ;TRAPPED THRU LOC. 114
 6085  021354                    T0244:
 6086  021354  104000                    EMT                     ;TRAPPED THRU LOC. 244
 6087  021356                    T0250:
 6088  021356  104000                    EMT                     ;TRAPPED THRU LOC. 250
 6089                            .SBTTL ** STARTING OF TRAP TEST **
 6090
 6091                            ;SPECIAL CASE OF ODD;.EVEN .BYTE AND REGISTER 6
 6092          000000            HERE=0
 6093
 6094  021360  000000            K1:     0
 6095  021362  000000            K2:     0
 6096  021364  000000            K3:     0
 6097  021366  000000            K4:     0
 6098  021370  000000            K5:     0
 6099  021372  000000            K6:     0
 6100  021374  052525            K7:     052525
 6101  021376  052400            K10:    052400
 6102  021400  000000            K11:    0
 6103  021402  000000            K12:    0
 6104  021404  000176            SWR:    176
 6105
 6106  021406  032737  000001  001020    TESTN1: BIT     #1,@#$ENV
 6107  021414  001403                    BEQ     1$
 6108  021416  012767  001022  177760    MOV     #$SWREG,SWR
 6109  021424                    1$:
 6110                            ;*****************************************************************************************
 6111                            ;TEST 306       TEST AUTO INCREMENT AND DECREMENT OF R6 FOR WORD AND BYTES
 6112                            ;*****************************************************************************************
 6113  021424                    TS306:
 6114  021424  005006                    CLR     %6
 6115  021426  112667  156346          MOVB    (6)+,HERE       ;SIX SHOULD INCREMENT BY TWO
 6116  021432  020627  000002          CMP     %6,#2
 6117  021436  001401                    BEQ     BR1
 6118  021440  104000                    EMT                     ;R6 DID NOT AUTO INCREMENT BY TWO
 6119
 6120  021442  012706  001000    BR1:    MOV     #1000,%6
 6121  021446  114627  000000          MOVB    -(6),#HERE      ;SHOULD DECREMENT BY TWO
 6122  021452  020627  000776          CMP     %6,#776
 6123  021456  001401                    BEQ     BR2
 6124  021460  104000                    EMT                     ;R6 DID NOT AUTO DECREMENT BY 2
 6125
 6126  021462  005006    BR2:    CLR     %6
 6127  021464  112626                    MOVB    (6)+,(6)+       ;DOUBLES AUTO INCREMENT OF R6
 6128  021466  020627  000004          CMP     %6,#4
 6129  021472  001401                    BEQ     BR3
 6130  021474  104000                    EMT                     ;WRONG AUTO INCREMENT OF R6
 6131
 6132  021476  005006    BR3:    CLR     %6
 6133  021500  005004                    CLR     %4
 6134  021502  122624                    CMPB    (6)+,(4)+       ;TEST INCREMENT OF R6
 6135  021504  020627  000002          CMP     %6,#2
```

```
                        BEQ     BR4
                        EMT                             ;WRONG INCREMENT OF R6

BR4:    CLR     %6
        CLR     %4
        CMPB    (4)+,(6)+       ;TEST INCREMENT OF R6
        CMP     %6,#2
        BEQ     BR5
        EMT                     ;WRONG INCREMENT OF R6

BR5:    CLR     %6
        CLR     %4
        CMPB    (6)+,(4)+       ;TEST INCREMENT OF R4
        CMP     %4,#1
        BEQ     BR6
        EMT                     ;WRONG INCREMENT OF R4
BR6:    CLR     %6
        CLR     %4
        CMPB    (4)+,(6)+       ;TEST INCREMENT OF R6
        CMP     %6,#2
        BEQ     BR7
        EMT                     ;WRONG INCREMENT OF R6

BR7:    CLR     %6
        CLR     %4
        CMPB    (4)+,(6)+       ;TEST INCREMENT OF R4
        CMP     %4,#1
        BEQ     BR10
        EMT                     ;WRONG INCREMENT OF R4

BR10:   MOV     #1000,%6
        CMPB    -(6),#HERE      ;TEST DECREMENT OF R6
        CMP     #776,%6
        BEQ     TS307
        EMT                     ;WRONG DECREMENT OF R6,OR WRONG $TSTNM
;*******************************************************************************
;TEST 307        TEST TRANSFER OF .BYTE USING R6
;*******************************************************************************
TS307:
        MOV     #123456,K5
        MOV     #050505,K1
        MOV     #K1,%5          ;%5=(050505)K1
        MOV     #K5,%6          ;%6=(123456)K5
        MOVB    (6)+,(5)+       ;LOW .BYTE OF R6 TO R5
        CMP     #050456,K1
        BEQ     BR11
        EMT                     ;FALSE TRANSFER OF .BYTE

BR11:   MOV     #123456,K5
        MOV     #050505,K1
        MOV     #K1,%5          ;%5(050505)K1
        MOV     #K6,%6          ;%6(123456)K5
        MOVB    -(6),(5)+       ;LOW .BYTE OF R6 TO R5 (DECREMENT)
        CMP     K1,#050456
        BEQ     BR12
        EMT                     ;FALSE R6 .BYTE TRANSFER
```

```
 6192
 6193  021724  012767  123456  177426  BR12:   MOV     #123456,K1
 6194  021732  012767  050505  177430          MOV     #050505,K5
 6195  021740  012705  021360                  MOV     #K1,%5          ;(123456)
 6196  021744  012706  021370                  MOV     #K5,%6          ;(050505)
 6197  021750  112526                          MOVB    (5)+,(6)+       ;LOW OF R5 TO LOW OF R6
 6198  021752  022767  050456  177410          CMP     #050456,K5
 6199  021760  001401                          BEQ     BR13
 6200  021762  104000                          EMT                     ;FALSE R6 .BYTE TRANSFER
 6201
 6202  021764  012767  123456  177366  BR13:   MOV     #123456,K1
 6203  021772  012767  050505  177370          MOV     #050505,K5
 6204  022000  012705  021361                  MOV     #K1+1,%5        ;123456
 6205  022004  012706  021370                  MOV     #K5,%6          ;050505
 6206  022010  112526                          MOVB    (5)+,(6)+       ;HIGH OF R5 TO LOW OF R6
 6207  022012  026727  177352  050647          CMP     K5,#050647
 6208  022020  001401                          BEQ     BR14
 6209  022022  104000                          EMT                     ;FALSE R6 .BYTE TRANSFER
 6210
 6211  022024  012767  123456  177326  BR14:   MOV     #123456,K1
 6212  022032  012767  050505  177330          MOV     #050505,K5
 6213  022040  012705  021361                  MOV     #K1+1,%5        ;R5-123456-ODD ADDRESS
 6214  022044  012706  021370                  MOV     #K5,%6          ;R6-050505--.EVEN ADDRESS
 6215  022050  112625                          MOVB    (6)+,(5)+       ;LOW OF R6 TO HIGH OF R5
 6216  022052  022767  042456  177300          CMP     #042456,K1
 6217  022060  001401                          BEQ     TS310
 6218  022062  104000                          EMT                     ;FAILED LOW OF 6 TO HIGH OF 5,OR WRONG STSTNM
 6219                                  ;*****************************************************************************
 6220                                  ;TEST 310       TEST BYTE OPERATION WITH SEQUENTIAL ODD-EVEN ADDRESS
 6221                                  ;*****************************************************************************
 6222  022064                          TS310:
 6223  022064  126767  177304  177303          CMPB    K7,K7+1         ;SAME .WORD LOW TO HIGH
 6224  022072  001401                          BEQ     BR15
 6225  022074  104000                          EMT                     ;SHOULD COMPARE LOW TO HIGH
 6226
 6227  022076  126767  177273  177270  BR15:   CMPB    K7+1,K7         ;COMPARE ODD TO .EVEN SAME .WORD
 6228  022104  001401                          BEQ     BR16
 6229  022106  104000                          EMT                     ;ODD TO .EVEN .B..E FAILURE
 6230
 6231  022110  126767  177263  177256  BR16:   CMPB    K10+1,K7        ;SEQUENTIAL .BYTES
 6232  022116  001401                          BEQ     BR17
 6233  022120  104000                          EMT                     ;ODD TO .EVEN FAILED
 6234
 6235  022122  126767  177250  177242  BR17:   CMPB    K10,K6
 6236  022130  001401                          BEQ     BR20
 6237  022132  104000                          EMT                     ;.EVEN TO EVEN FAILED
 6238  022134  126767  177235  177235  BR20:   CMPB    K7+1,K10+1
 6239  022142  001401                          BEQ     BR21
 6240  022144  104000                          EMT                     ;ODD TO ODD FAILED
 6241
 6242  022146  126767  177224  177223  BR21:   CMPB    K10,K10+1
 6243  022154  001001                          BNE     BR22
 6244  022156  104000                          EMT                     ;LOW TO HIGH IN SAME .WORD FAILED
 6245
 6246  022160  126767  177213  177211  BR22:   CMPB    K10+1,K10+1
 6247  022166  001401                          BEQ     BR23
```

```
                                        EMT                             ;HIGH TO LOW IN SAME .WORD FAILED

022172  126767  177200  177175  BR23:   CMPB    K10,K7+1
022200  001001                          BNE     TS311
022202  104000                          EMT                             ;.EVEN TO ODD FAILED,OR WRONG $TSTNM


                                ;*********************************************************************** *********
                                ;TEST 311       TEST THAT DECREMENT R6 TO A VALUE LESS THAN 400 TRAPS
                                ;***********************************************************************************
022204                          TS311:
022204  012706  000150                  MOV     #150,%6                 ;R6 = 150
022210  012767  022222  155566          MOV     #TDEC1,4                ;STACK OVERFLOW TRAP POINTER
022216  005746                          TST     -(6)                    ;WITH R6 = 150 SHOULD TRAP
022220  104000                          EMT                             ;SHOULD HAVE TRAPPED,OR WRONG $TSTNM
022222                          TDEC1:

                                ;***********************************************************************************
                                ;TEST 312       TEST FOR DECREMENT OF R6 ON OVERFLOW TRAP
                                ;***********************************************************************************
022222                          TS312:
022222  012706  000150                  MOV     #150,%6                 ;R6 = 150
022226  012767  022236  155550          MOV     #TDEC2,4                ;TRAP POINTER
022234  005746                          TST     -(6)                    ;WITH R6 = 150 SHOULD TRAP
022236  020627  000142          TDEC2:  CMP     %6,#142                 ;DID R6 DECREMENT
022242  001401                          BEQ     TS313
022244  104000                          EMT                             ;R6 NOT = 142,OR WRONG $TSTNM

                                ;***********************************************************************************
                                ;TEST 313       TEST DIFFERENT TYPES OF OVERFLOW
                                ;***********************************************************************************
022246                          TS313:
022246  012706  000150                  MOV     #150,%6
022252  005067  155670                  CLR     146                     ;STATUS WORD OF LOC 10
022256  012767  022266  155520          MOV     #TDEC3,4                ;RETURN TO LOC 4
022264  005246                          INC     -(6)
022266  005767  155654          TDEC3:  TST     146
022272  001001                          BNE     1$
022274  104000                          EMT                             ;INCREMENT OPERATION NOT INHIBITED
022276  012705  001000          1$:     MOV     #1000,%5
022302  012706  000400                  MOV     #400,%6
022306  012767  022320  155470          MOV     #TDEC4,4
022314  124645                          CMPB    -(6),-(5)
022316  104000                          EMT                             ;STACK = 400 AND DECREMENTED, SHOULD TRAP
022320  012706  000400          TDEC4:  MOV     #400,%6
022324  012767  022336  155452          MOV     #TDEC7,4
022332  134546                          BITB    -(5),-(6)
022334                          TDEC6:
022334  104000                          EMT                             ;NO STACK OVERFLOW,OR WRONG $TSTNM
022336                          TDEC7:

                                ;***********************************************************************************
                                ;TEST 314       TEST THAT AN 77 CAUSES AN OVERFLOW TRAP
                                ;***********************************************************************************
022336                          TS314:
022336  012706  000400                  MOV     #400,%6                 ;SET UP STACK TO OVERFLOW
```

```
6304  022342  012767  022360  155440          MOV     #VDEC2,10       ;SET UP 77 VECTOR
6305  022350  012767  022364  155426          MOV     #VDEC,4 ;SET UP OVERFLOW VECTOR
6306  022356  000077                          77                      ;THIS TRAP SHOULD CAUSE OVERFLOW
6307  022360  000167  157544          VDEC2:  JMP     ERROR1          ;USE JUMP TO GET TO ERROR BECAUSE UNSURE WHAT EMT WILL D
6308  022364  012767  021340  155416  VDEC:   MOV     #T010,10        ;RESTORE VECTOR
6309                                  ;*************************************************************************************
6310                                  ;TEST 315       TEST THAT AN IOT CAUSES AN OVERFLOW TRAP
6311                                  ;*************************************************************************************
6312  022372                          TS315:
6313  022372  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
6314  022376  012767  022414  155414          MOV     #VDEC4,20       ;SET UP IOT VECTOR
6315  022404  012767  022420  155372          MOV     #VDEC3,4        ;SET UP OVERFLOW VECTOR
6316  022412  000004                          IOT                     ;THIS TRAP SHOULD CAUSE OVERFLOW
6317  022414  000167  157510          VDEC4:  JMP     ERROR1          ;USE JUMP TO GET TO ERROR BECAUSE UNSURE WHAT EMT WILL D
6318  022420  012767  021344  155372  VDEC3:  MOV     #T020,20        ;RESTORE VECTOR
6319
6320                                  ;*************************************************************************************
6321                                  ;TEST 316       TEST THAT AN EMT CAUSES AN OVERFLOW TRAP (CHECK OF YELLOW ZONE)
6322                                  ;*************************************************************************************
6323  022426                          TS316:
6324  022426  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
6325  022432  012767  022450  155370          MOV     #VDEC6,30       ;SET UP INST VECTOR
6326  022440  012767  022454  155336          MOV     #VDEC5,4        ;SET UP OVERFLOW BECTOR
6327  022446  104000                          EMT                     ;THIS TRAP SHOULD CAUSE OVERFLOW
6328  022450  000167  157454          VDEC6:  JMP     ERROR1          ;USE JUMP TO GET TO ERROR BECAUSE UNSURE WHAT EMT WILL D
6329  022454  012767  002130  155346  VDEC5:  MOV     #ERROR1,30      ;RESTORE VECTOR
6330
6331                                  ;*************************************************************************************
6332                                  ;TEST 317       TEST THAT AN TRAP CAUSES AN OVERFLOW TRAP
6333                                  ;*************************************************************************************
6334  022462                          TS317:
6335  022462  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
6336  022466  012767  022504  155340          MOV     #VDEC8,34       ;SET UP TRAP VECTOR
6337  022474  012767  022510  155302          MOV     #VDEC7,4        ;SET UP OVERFLOW VECTOR
6338  022502  104400                          TRAP                    ;THIS TRAP SHOULD CAUSE OVERFLOW
6339  022504  000167  157420          VDEC8:  JMP     ERROR1          ;USE JUMP TO GET TO ERROR BECAUSE UNSURE WHAT EMT WILL D
6340  022510  012767  021350  155316  VDEC7:  MOV     #T034,34        ;RESTORE VECTOR
6341                                  ;*************************************************************************************
6342                                  ;TEST 320       TEST THAT AN TRT CAUSES AN OVERFLOW TRAP
6343                                  ;*************************************************************************************
6344  022516                          TS320:
6345  022516  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
6346  022522  012767  022540  155264          MOV     #VDEC10,14      ;SET UP TRT VECTOR
6347  022530  012767  022544  155246          MOV     #VDEC9,4        ;SET UP OVERFLOW VECTOR
6348  022536  000003                          TRT                     ;THIS TRAP SHOULD CAUSE OVERFLOW
6349  022540  000167  157364          VDEC10: JMP     ERROR1          ;USE JUMP TO GET TO ERROR BECAUSE UNSURE WHAT EMT WILL D
6350  022544  012767  021342  155242  VDEC9:  MOV     #T014,14        ;RESTORE VECTOR
6351                                  ;*************************************************************************************
6352                                  ;TEST 321       TEST THAT AN ILLA CAUSES AN OVERFLOW TRAP
6353                                  ;*************************************************************************************
6354  022552                          TS321:
6355  022552  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
6356  022556  012767  022574  155220          MOV     #VDEC11,4       ;SET UP ILLA VECTOR
6357  022564  012767  022600  155212          MOV     #VDEC12,4       ;SET UP OVERFLOW VECTOR
6358  022572  004700                          ILLA                    ;THIS TRAP SHOULD CAUSE OVERFLOW
6359  022574  000167  157330          VDEC11: JMP     ERROR1          ;USE JUMP TO GET TO ERROR BECAUSE UNSURE WHAT EMT WILL D
```

```
 6360  022600  012767  021336  155176  VDEC12: MOV     #T04,4  ;RESTORE VECTOR
 6361  022606  020627  000370                  CMP     %6,#370         ;STACK PUSHED FOUR WORDS?
 6362  022612  001401                          BEQ     TS322
 6363  022614  104000                          EMT                     ;TRAP OVERFLOW DID NOT OCCUR
 6364                                  ;*****************************************************************************
 6365                                  ;TEST 322       TEST THAT AN ILLB CAUSES AN OVERFLOW TRAP
 6366                                  ;*****************************************************************************
 6367  022616                          TS322:
 6368  022616  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
 6369  022622  012767  022640  155154          MOV     #VDEC13,4       ;SET UP ILLB VECTOR
 6370  022630  012767  022644  155146          MOV     #VDEC14,4       ;SET UP OVERFLOW VECTOR
 6371  022636  000100                          ILLB                    ;THIS TRAP SHOULD CAUSE OVERFLOW
 6372  022640  000167  157264          VDEC13: JMP     ERROR1          ;USE JUMP TO GET TO ERROR BECAUSE UNSURE WHAT EMT WILL D
 6373  022644  012767  021336  155132  VDEC14: MOV     #T04,4  ;RESTORE VECTOR
 6374
 6375                                  ;*****************************************************************************
 6376                                  ;TEST 323       TEST FOR FALSE OVERFLOW TRAP
 6377                                  ;*****************************************************************************
 6378  022652                          TS323:
 6379
 6380  022652  012767  022720  155124          MOV     #FOVER,4        ;SET UP OVERFLOW POINTER
 6381  022660  012706  001002                  MOV     #1002,%6
 6382  022664  005746                          TST     -(6)            ;SHOULD NOT OVERFLOW
 6383  022666  012706  002002                  MOV     #2002,%6
 6384  022672  005746                          TST     -(6)            ;SHOULD NOT OVERFLOW
 6385  022674  012706  004002                  MOV     #4002,%6
 6386  022700  005746                          TST     -(6)            ;SHOULD NOT OVERFLOW
 6387  022702  012706  010002                  MOV     #10002,%6
 6388  022706  005746                          TST     -(6)
 6389  022710  012706  020000                  MOV     #20000,%6       ;SHOULD NOT OVERFLOW
 6390  022714  005746                          TST     -(6)
 6391  022716  000401                          BR      STP
 6392  022720                          FOVER:
 6393  022720  104000                          EMT                     ;IT OVERFLOWED,OR WRONG $TSTNM
 6394  022722  012767  021336  155054  STP:    MOV     #T04,4
 6395  022730  005067  155052                  CLR     6
 6396                                  ;*****************************************************************************
 6397                                  ;TEST 324       TEST THAT BIT 4 PSW WILL CAUSE A TRAP TO 14
 6398                                  ;*****************************************************************************
 6399  022734                          TS324:
 6400  022734  012706  001000                  MOV     #STBOT,SP
 6401  022740  012767  022764  155046          MOV     #RETAT,RTRAP4   ;SET UP TO TRAP TO 14
 6402  022746  012746  000020                  MOV     #20,-(SP)       ;PUSH T BIT
 6403  022752  012746  022760                  MOV     #.+6,-(SP)      ;PUSH PC
 6404  022756  000002                          RTI                     ;SET T BIT
 6405  022760  000240                          NOP                     ;TRAP HERE
 6406  022762  104000                          EMT                     ;TRACE BIT DID NOT TRAP!,OR WRONG $TESTN
 6407  022764                          RETAT:
 6408                                  ;*****************************************************************************
 6409                                  ;TEST 325       TEST  STACK POINTER DECREMENTS
 6410                                  ;*****************************************************************************
 6411  022764                          TS325:
 6412  022764  012706  001000                  MOV     #STBOT,SP
 6413  022770  012767  023014  155016          MOV     #RETBT,RTRAP4
 6414  022776  012746  000020                  MOV     #20,-(SP)       ;PUSH T BIT
 6415  023002  012746  023010                  MOV     #.+6,-(SP)      ;PUSH PC
```

```
                                        RTI                             ;SET T BIT
                                        NOP                             ;TRAP HERE
                                        EMT                             ;TRACE BIT DID NOT TRAP!
                        000774  RETBT:   CMP     SP,#STBOT-4
                                        BEQ     TS326
                                        EMT                             ;STACK POINTER WAS NOT PUSHED BY TRAP,OR WRONG STESTN
                                ;*******************************************************************************
                                ;TEST 326       TEST  FOR PROPER PC ON STACK
                                ;*******************************************************************************
                                TS326:
                        001000          MOV     #STBOT,SP
                154756  023050          MOV     #RETCT,RTRAP4
                        000020          MOV     #20,-(SP)               ;PUSH T BIT
                        023050          MOV     #.+6,-(SP)              ;PUSH PC
                        000002          RTI                             ;SET T BIT
                                                                        ;TRAP HERE
                155716  023050  RETCT:   CMP     #.,STBOT-4
                                        BEQ     TS327
                                        EMT                             ;CORRECT PC WAS NOT SAVED ON STACK,OR WRONG STESTN


                                ;*******************************************************************************
                                ;TEST 327       TEST  THAT RTT POPS T- BIT
                                ;*******************************************************************************
                                TS327:

                                        MOV     #STBOT,SP
                                        CLR     R1                      ;CLEAR R1
                                        MOV     #20,-(SP)
                                        MOV     #RTT1,-(SP)
                154706                  MOV     #RTT2,14
                                        RTT
                                RTT1:   NOP
                                        BEQ     TS330
                                        EMT                             ;T-BIT DID NOT TRAP,OR WRONG STESTN

                                RTT2:
                                ;*******************************************************************************
                                ;TEST 330       TEST  THAT RTT ALLOWS ONE INST. BEFORE TRAP
                                ;*******************************************************************************
                                TS330:
                        177777          MOV     #177777,%5
                                RTT5:   MOV     #STBOT,SP
                        000020          MOV     #20,-(SP)
                        023150          MOV     #RTT3,-(SP)
                154650  023160          MOV     #RTT4,14
                                        CLR     R1                      ;CLEAR R0
                                        RTT                             ;SET T-BIT
                                RTT3:   INC     R1
                                        INC     %5
                                        BEQ     RTT5                    ;DO THIS TEST NO MORE THAN 2 TIMES
                                        EMT                             ;DID NOT TRAP
                                RTT4:   DEC     R1                      ;SEE IF RTT ALLOWS 1 INST.
                                        BEQ     RTT6
                                        INC     %5                      ;DO THIS TEST NO MORE THAN TWO TIMES
                                        BEQ     RTT5
```

```
                        EMT                             ;RTT DID NOT ALLOW 1 INST.,OR WRONG STESTN
                RTT6:
                ;*****************************************************************************************
                ;TEST 331       TEST  THAT RTI DOES NOT ALLOW 1 INST.
                ;*****************************************************************************************
                TS331:
                        MOV     #STBOT,SP
                        MOV     #20,-(SP)
                        MOV     #RTI1,-(SP)
                        MOV     #RTI2,14
                        CLR     R1
                        RTI                             ;SET T-BIT
                RTI1:   INC     R1                      ;RTI SHOULD NOT ALLOW THIS
                        EMT                             ;T- BIT DID NOT CAUSE TRAP
                RTI2:   TST     R1
                                                        ;RTI SHOULD NOT ALLOW 1 INST. BEFORE TRAP
                        BEQ     TS332
                        EMT                             ;RTI DID ALLOW 1 INST. BEFORE TRAP,OR WRONG STESTN

                ;*****************************************************************************************
                ;TEST 332       TEST TRAP ON TRAP THAT TRACE BIT TRAPS ARE INHIBITED ON TRAP INST
                ;*****************************************************************************************
                TS332:

                        MOV     #STBOT,%6
                        MOV     #TRACE,14               ;TRACE TRAP
                        CLR     #16
                        CLR     #22
                        MOV     #TONT1,20               ;IOT TRAP
                        MOV     #20,-(SP)               ;PUSH T BIT
                        MOV     #.+6,-(SP)              ;PUSH PC
                        RTT
                        IOT                             ;TRAP, NEW CC HAVE TRACE RESET
                TRACE:
                        EMT                             ;TRACE TRAP WAS NOT INHIBITED
                BR70:
                        EMT                             ;WRONG TSTNM,OR WRONG $TSTNM
                TONT1:  MOV     #16,14
                        MOV     #22,20
```

```
 6511                                   ;*****************************************************************************
 6512                                   ;TEST 333       TEST THAT THE TRACE BIT IS SAVED IN THE STACK
 6513                                   ;*****************************************************************************
 6514  023316                           TS333:
 6515  023316  012706  001000                 MOV     #STBOT,%6       ;SET UP STACK POINTER
 6516  023322  012767  023346  154464         MOV     #TRC1,14        ;TRACE TRAP RETURN
 6517  023330  005067  154462                 CLR     16
 6518  023334  012746  000020                 MOV     #20,-(SP)       ;SET THE T BIT
 6519  023340  012746  023346                 MOV     #TRC1,-(SP)
 6520  023344  000002                         RTI
 6521  023346  036727  155424  000020  TRC1:  BIT     STBOT-2,#20     ;CHECK FOR T BIT ON STACK
 6522  023354  001001                         BNE     STP3D
 6523  023356                           STP3:
 6524  023356  104000                         EMT                     ;T BIT NOT SAVED ON THE STACK,OR WRONG $TSTNM
 6525  023360  012767  021342  154426  STP3D: MOV     #TO14,14
 6526
```

```
                                ;*************************************************************************
                                ;THIS ROUTINE TESTS THAT NO LEGAL ADDRESS TRAPS AND THAT AN ILLEGAL
                                ;ADDRESS TRAPS TO LOCATION 4.  THIS WILL RUN ON 30K SYSTEM.  BUT IF
                                ;SWITCH REGISTER BIT 1=0, THEN THE MEMORY FROM 28K-30K IS NOT LOOKED
                                ;AT, SINCE IT MAY HAVE I/O DEVICES.  IF SWR BIT 1=1, THEN THAT AREA IS
                                ;CHECKED.  (IT SHOULD EITHER ALL TRAP OR ALL NOT TRAP).  LOC 160000
                                ;IS NO LONGER GUARANTEED TO TRAP, SINCE IT MAY CONTAIN MEMORY. LOCATION
                                ;177700 (THE UNIBUS ADDRESS FOR R0 ON OLDER SYSTEMS) IS USED FOR FORCING
                                ;A TIMEOUT IN THE EVENT THAT THERE WAS NO TIMEOUT FROM 0K-28K OR 30K.
                                ;THIS ROUTINE TESTS MEMORY UNTIL IT DOES A NXM STOP
                                ;*************************************************************************
                                ;TEST 334       TEST NON-EXISTENT ADDRESS TRAPS
                                ;*************************************************************************
023366                          TS334:
023366  005000                  1$:     CLR     R0              ;
023370  005067  154412                  CLR     6               ;
023374  012767  023460  154402          MOV     #ATRAP,4        ;SET UP ADDRESS TRAP ENTRANCE
023402  012706  001000                  MOV     #STBOT,SP       ;SET STACK POINTER
023406  105720                  NOR:    TSTB    (0)+            ;IF OUTSIDE OF CORE, TRAP TO 4
023410  020027                          CMP     R0,(PC)+        ;IS POINTER INSIDE 28K (30K) CORE
023412  160000                  HICORE: .WORD   160000          ;MAY BE CHANGED TO 170000 IF 30K
023414  103774                          BLO     NOR             ;TEST THE REST OF CORE
023416  012737  023432  000004          MOV     #RØTRAP,@#4     ;SET UP NEW VECTOR POINTER
023424  105737  177700                  TSTB    @#177700        ;SHOULD CAUSE A TRAP
023430                          TRPADR:
023430  104000                          EMT                     ;SHOULD HAVE TRAPED
                                ;TRAP TO HERE IF FORCING TRAP BY TESTING 177700
023432  106767  154340          RØTRAP: MFPS    STATUS
023436  005767  154334                  TST     STATUS          ;TEST PSW
023442  001401                          BEQ     1$
023444  104000                          EMT                     ;NEW PSW SHOULD HAVE BEEN ZERO
023446  026727  155322  023430  1$:     CMP     STBOT-4,#TRPADR ;TEST OLD PC AT STACK
023454  001437                          BEQ     TRAPB
023456  104000                          EMT                     ;OLD PC WAS NOT SAVED
                                ;RETURN HERE ON AN ADDRESS TRAP FROM MEMORY BELOW 28K (OR 30K)
023460  005300                  ATRAP:  DEC     R0              ;
023462  010067  000032                  MOV     R0,CORH         ;MOVE THE FIRST NXM LOCATION IN CORH
                                ;THIS ROUTINE DOES NXM TRAPS UNTIL IT FINDS AN EXISTENT MEMORY LOCATION
023466  013700  023412                  MOV     @#HICORE,R0     ;SET UP THE HIGHEST MEM LOCATION
023472  005300                          DEC     R0              ;MAKE 1 LESS THAN THE HIGHEST CORE BOUNDARY
023474  000402                          BR      NOSUB           ;DON'T SUBTRACT 1K FIRST TIME
023476  162700  001000          CTRAP:  SUB     #1000,R0        ;SUBTRACT 1K OCTAL BYTE FROM ADDRESS
                                                                ;TO SPEED UP TESTING
023502  012767  023526  154274  NOSUB:  MOV     #BTRAP,4        ;SET UP THE VECTOR
023510  012706  001000                  MOV     #STBOT,SP
023514  005710                          TST     (R0)            ;DOES THIS MEMORY EXIST?
                                                                ;IF NXM, TRAP TO BTRAP
023516  020027                  DTRAP1: CMP     R0,(PC)+        ;IF EXISTS, IS THIS THE SAME TRAP THAT CAUSED
                                                                ;TRAP TO ATRAP
023520  000000                  CORH:   .WORD   0
023522  101414                          BLOS    TRAPB
023524  104000                          EMT                     ;CONTENTS OF R0 SHOULD BE LESS THAN OR EQUAL  TO CORH
                                                                ;IF THIS COMPARISON FAILS IT MEANS
                                                                ;THAT SOME LEGAL ADDRESS TRAPPED, OR
                                                                ;THAT AN ILLEGAL ADDRESS DID NOT TRAP
023526  106767  154244          BTRAP:  MFPS    STATUS
```

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6583  023532  005767  154240          TST     STATUS
6584  023536  001401                  BEQ     1$
6585  023540  104000                  EMT                     ;NEW PSW SHOULD HAVE BEEN ZERO
6586  023542  026727  155226  023516  1$:     CMP     STBOT-4,#DTRAP1 ;CHECK IF TRAP PC IS OK
6587  023550  001752                  BEQ     CTRAP
6588  023552                          AUTO1:
6589  023552  104000                  EMT                     ;OLD PC WAS NOT SAVED OR WRONG $TESTN
6590  023554  012767  021336  154222  TRAPB:  MOV     #TO4,4          ;RESET TRAP CATCHER
6591  023562  005067  154220          CLR     6               ;RESET TRAP CATCHER
6592
6593
6594                                  ;THIS ROUTINE WILL FIGURE OUT IF YOU HAVE A DL11W
6595  023566  012706  001000          MOV     #STBOT,SP       ;SET UP THE STACK POINTER
6596  023572  012767  023606  154204  MOV     #NODL,4         ;SET UP THE TRAP VECTOR
6597  023600  005767  153760          TST     TTCSR           ;TEST THE PUNCH STATUS REGISTER
6598  023604  000405                  BR      DL11W
6599  023606  012767  021336  154170  NODL:   MOV     #TO4,4
6600  023614  000167  101036          JMP     SLU1ST          ;IF NO SLU FIND OUT WHY IN SLU TEST
6601  023620  012767  021336  154156  DL11W:  MOV     #TO4,4
6602
6603                                  ;*****************************************************************************
6604                                  ;TEST 335       TEST THAT A TTY INTERRUPT CAUSES AN OVERFLOW TRAP
6605                                  ;*****************************************************************************
6606  023626                          TS335:
6607  023626  012767  000340  154142          MOV     #340,STATUS     ;LOCK OUT INTERRUPT
6608  023634  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
6609  023640  012767  023702  154136          MOV     #TDEC77,4       ;SET UP OVERFLOW TRAP
6610  023646  016767  154212  001542          MOV     64,     TEMP1   ;SAVE CONTENTS OF INTERRUPT VECTOR
6611  023654  012767  023700  154202          MOV     #TDEC8,64       ;SET UP INTERRUPT VECTOR
6612  023662  012767  000100  153674          MOV     #100,TTCSR      ;SET INTERRUPT ENABLE
6613  023670  005067  154102                  CLR     STATUS          ;ALLOW INTERRUPT TO OCCUR
6614  023674  000167  100756                  JMP     SLU1ST          ;NO INTERRUPT OCCURRED SO GO TO SLU TEST
6615                                                                  ;TO FIND OUT WHY ADD REPORT PROPER ERROR
6616  023700                          TDEC8:
6617  023700  104000                  EMT                     ;OVERFLOW TRAP DID NOT OCCUR
6618  023702  005067  153656          TDEC77: CLR     TTCSR           ;CLEAR INTERRUPT ENABLE
6619  023706  012767  021336  154070          MOV     #TO4,4
6620  023714  005067  154066          CLR     6
6621  023720  016767  001472  154136          MOV     TEMP1,  64      ;RESTORE CONTENTS OF INTERRUPT VECTOR
6622                                  ;*****************************************************************************
6623                                  ;TEST 336       TEST THAT A PENDING INTERRUPT OCCURS BEFORE TRAP
6624                                  ;*****************************************************************************
6625  023726                          TS336:
6626  023726  012706  001000          MOV     #STBOT,%6
6627  023732  012767  000340  154036  MOV     #340,STATUS     ;SET TO A HIGH PRIORITY LEVEL
6628  023740  016767  154120  001450  MOV     64,     TEMP1   ;SAVE CONTENTS OF INTERRUPT VECTOR
6629  023746  012767  024012  154110  MOV     #TR0,64
6630  023754  012767  000100  153602  MOV     #100,TTCSR      ;INTERRUPT FOR TTY PUNCH/PRINTER
6631  023762  012767  024014  154044  MOV     #BR7!,34        ;TRAP VECTOR
6632  023770  012767  024016  154066  MOV     #TR2,64         ;TTY VECTOR
6633  023776  012767  000340  154032  MOV     #340,36         ;IF TRAP TRAPS, MOVE 340 TO PRIORITY
6634  024004  005067  153766          CLR     STATUS          ;SHOULD INTERRUPT AT END OF CLR INST
6635  024010  104400                  TRAP                    ;TTY INTERRUPT SHOULD OVERRIDE TRAP
6636  024012                          TR0:
6637  024012  104000                  EMT                     ;TTY SHOULDN'T HAVE INTERRUPTED
6638  024014                          BR71:
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6639  024014  104000                          EMT                     ;TRAP OCCURRED FIRST
6640  024016  005067  154014          TR2:    CLR     36
6641  024022  016767  001370  154034          MOV     TEMP1,  64      ;RESTORE CONTENTS OF INTERRUPT VECTOR
6642  024030  042767  000100  153526          BIC     #100,TTCSR
6643                                  ;*************************************************************************
6644                                  ;TEST 337       TEST THAT A PENDING INTERRUPT, INTERRUPTS BETWEEN TRAPS
6645                                  ;*************************************************************************
6646  024036                          TS337:
6647  024036  012706  001000                  MOV     #STBOT,%6
6648  024042  012767  000340  153726          MOV     #340,STATUS
6649  024050  012767  000100  153506          MOV     #100,TTCSR
6650  024056  012767  024124  153750          MOV     #TR3,34         ;TRAP
6651  024064  016767  153774  001324          MOV     64,     TEMP1   ;SAVE CONTENTS OF INTERRUPT VECTOR
6652  024072  012767  024130  153764          MOV     #TR4,64         ;TTY OUTPUT
6653  024100  012767  000340  153760          MOV     #340,66         ;TTY OUTPUT PRIORITY
6654  024106  012767  024126  153704          MOV     #TR5,20         ;IOT
6655  024114  012767  000340  153700          MOV     #340,22         ;IOT PRIORITY
6656  024122  104400                          TRAP                    ;THE ACT OF TRAPPING LOWER PRIORITY
6657  024124  000004                  TR3:    IOT                     ;INTERRUPT SHOULD OCCUR IN PLACE OF IOT TRAP
6658  024126                          TR5:
6659  024126  104000                          EMT                     ;NO INTERRUPT BETWEEN TRAPS,OR WRONG $TSTNM
6660  024130  005067  153666          TR4:    CLR     22              ;CLR IOT PRIORITY
6661  024134  005067  153726                  CLR     66
6662  024140  012767  021350  153666          MOV     #TO34,34
6663  024146  016767  001244  153710          MOV     TEMP1,  64      ;RESTORE CONTENTS OF INTERRUPT VECTOR
6664  024154  012767  000022  153636          MOV     #22,20
6665  024162  042767  000100  153374          BIC     #100,TTCSR      ;CLEAR IE BIT IN SLU1 XMIT CSR
6666
6667                                  ;*************************************************************************
6668                                  ;TEST 340       TEST THAT "RESET" GOES TO OUTSIDE WORLD
6669                                  ;*************************************************************************
6670  024170                          TS340:
6671  024170  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
6672  024176  001403                          BEQ     70$             ;IF NO THEN DO TEST
6673  024200  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
6674  024204  001013                          BNE     TS341           ;IF NO THEN SHIP TO NEXT TEST
6675  024206                          70$:
6676  024206  016700  153350                  MOV     TKB,R0          ;MAKE SURE RECEIVER DONE IS CLEAR
6677  024212  012767  000100  153340          MOV     #100,TRCSR      ;SET INTERRUPT ENABLE
6678  024220  000005                          RESET                   ;SHOULD CLEAR INTERRUPT ENABLE
6679  024222  032767  000100  153330          BIT     #100,TRCSR      ;TEST FOR CLEAR
6680  024230  001401                          BEQ     TS341
6681  024232  104000                          EMT                     ;RESET FAILED TO CLEAR TRCSR,OR WRONG $TSTNM
6682  024234                          NODL2:
6683                                  ;*************************************************************************
6684                                  ;TEST 341       TEST THAT RESET HAS NO EFFECT ON THE TRACE TRAP
6685                                  ;*************************************************************************
6686  024234                          TS341:
6687  024234  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
6688  024242  001403                          BEQ     70$             ;IF NO THEN DO TEST
6689  024244  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
6690  024250  001024                          BNE     TS342           ;IF NO THEN SHIP TO NEXT TEST
6691  024252                          70$:
6692  024252  012706  001000                  MOV     #STBOT,%6       ;SET STACK
6693  024256  012767  024304  153530          MOV     #RESET2,14      ;SET UP TRACE VECTOR
6694  024264  012746  000020                  MOV     #20,-(R6)       ;SET THE T-BIT ON STACK
```

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 6695  024270  012746  024276                MOV     #1$,-(R6)       ;MOVE NEW PC ON STACK
 6696  024274  000006                        RTT
 6697  024276  000005                1$:     RESET                   ;SHOULD HAVE NO EFFECT
 6698  024300  000005                        RESET                   ;NO EFFECT
 6699  024302                        RESET3:
 6700  024302  104000                        EMT                     ;TRACE TRAP FAILED,OR WRONG $TSTNM
 6701  024304  005067  153466        RESET2: CLR     STATUS          ;CLEAR TRACK
 6702  024310  005067  153502                CLR     16              ;TRACE STATUS
 6703  024314  012767  021342  153472        MOV     #T014,14
 6704  024322                        SKTST2:
 6705
 6706                                ;*****************************************************************************
 6707                                ;TEST 342       TEST THE 'WAIT' INSTRUCTION
 6708                                ;*****************************************************************************
 6709  024322                        TS342:
 6710  024322  122767  000001  154470        CMPB    #APTENV,$ENV            ;RUNING IN APT MODE?
 6711  024330  001003                        BNE     1$                      ;IF NOT, DO THIS TEST
 6712  024332  005767  154450                TST     $PASS                   ;IS THIS THE FIRST PASS?
 6713  024336  001051                        BNE     STP4E                   ;IF NOT FIRST PASS, SKIP TEST
 6714  024340                        1$:
 6715  024340  042767  000100  ''3216        BIC     #100,TTCSR      ;CLEAR INTERRUPT ENABLE
 6716  024346  012706  001000                MOV     #STBOT,SP       ;SET UP THE STACK
 6717  024352  016767  153506  0C )36        MOV     64,     TEMP1   ;SAVE CONTENTS OF INTERRUPT VECTOR
 6718  024360  012767  024440  153476        MOV     #WATE,64        ;SET UP THE INTERRUPT VECTOR
 6719  024366  005067  153474                CLR     66
 6720  024372  105767  153166        WATE1:  TSTB    TTCSR           ;WAIT FOR READY
 6721  024376  100375                        BPL     WATE1           ;TO BE UP
 6722  024400  012767  000015  153160        MOV     #15,TPB         ;DO A CARRIAGE RETURN
 6723  024406  105767  153152        WATE2:  TSTB    TTCSR           ;WAIT FOR READY TO COME UP
 6724  024412  100375                        BPL     WATE2
 6725  024414  012767  000015  153144        MOV     #15,TPB         ;DO ANOTHER CARRIAGE RETURN
 6726  024422  052767  000100  153134        BIS     #100,TTCSR      ;SET THE INTERRUPT ENABLE
 6727  024430  005067  153342                CLR     STATUS          ;CLEAR THE PSW
 6728  024434  000001                WATE3:  WAIT                    ;WAIT FOR THE INTERRUPT
 6729  024436  104000                        EMT                     ;WAIT INSTRUCTION DID NOT LOOP
 6730  024440  005767  153332        WATE:   TST     STATUS  ;IS THE PSW CORRECT?
 6731  024444  001401                        BEQ     1$
 6732  024446  104000                        EMT                     ;NEW PSW SHOULD HAVE BEEN ZERO
 6733  024450  026727  154320  024436  1$:     CMP     STBOT-4,#WATE3+2        ;IS THE OLD PC SAVED
 6734  024456  001401                        BEQ     STP4E
 6735  024460                        STP4:
 6736  024460  104000                        EMT                     ;OLD PC WAS NOT SAVED OR WRONG $TESTN
 6737  024462  016767  000730  153374  STP4E:  MOV     TEMP1,  64      ;RESTORE CONTENTS OF INTERRUPT VECTOR
 6738  024470  042767  000100  153066        BIC     #100,TTCSR      ;CLEAR IE BIT IN SLU1 XMIT CSR
 6739                                ;*****************************************************************************
 6740                                ;TEST 343       TEST THAT USING REGISTER ADDR (177700) CAUSES TIME OUT.
 6741                                ;*****************************************************************************
 6742  024476                        TS343:
 6743                                        ;
 6744                                        ;REGISTER ADDRESS (177700-177717) CAUSE TIME OUT WHEN USED
 6745                                        ;AS PROGRAM ADDRESS BY THE CPU.
 6746                                        ;
 6747  024476  012706  001000                MOV     #STBOT,SP       ;SET  STACK POINTER
 6748  024502  012767  024516  153274        MOV     #RETR1,RTRAP5   ;SET TRAP RETURN ADDR
 6749  024510  005237  177700        PCN1:   INC     @#177700        ;BAD ADDR REFERENCE, TRAP TO 4
 6750  024514  104000                        EMT                     ;REFERENCING 177700 DID NOT CAUSE TIME OUT
```

```
6751  024516  022767  024514  154250  RETR1:  CMP     #PCN1+4,STBOT-4 ;PROPER PC STORED ON STACK?
6752  024524  001401                          BEQ     TS344
6753  024526  104000                          EMT                     ;OLD PC WAS NOT SAVED IN STACK
6754
6755                                          ;************************************************************************
6756                                          ;ODD ADDRESS USED BY A 'WORD" INSTRUCTION SHOULD NOT
6757                                          ;CAUSE A TRAP, BUT THE LOW ORDER ADDRESS BIT WOULD BE IGNORED.
6758                                  ;*****************************************************************************************
6759                                  ;TEST 344       TEST ODD ADDRESS TRAP IS NOT IMPLEMENTED.
6760                                  ;*****************************************************************************************
6761  024530                          TS344:
6762                                          ;
6763  024530  012737  024554  000004          MOV     #RETR2,@#RTRAP5 ;SET TRAP RETURN ADDR
6764  024536  005037  000000                  CLR     @#0             ;PUT ALL 0 IN LOC 0
6765  024542  005337  000001                  DEC     @#1             ;DECREMENT ODD ADDRESS, SHOULD NOT TRAP
6766  024546  022737  177777  000000          CMP     #-1,@#0         ;WORD LOC 0 HAS ALL ONES?
6767  024554                          RETR2:
6768  024554  001401                          BEQ     TS345
6769  024556  104000                          EMT                     ;LOC 0 DID NOT STORE -1,OR ODD ADDR REFERENC' CAUSE TRAP
6770
6771                                          ;************************************************************
6772                                          ;
6773                                          ;USING ADDRESS 177700 IN MODE 2, CAUSES BUS ERROR, BUT
6774                                          ;THE REGISTER IN USE WILL BE INCREMENTED.
6775                                          ;
6776                                  ;*****************************************************************************************
6777                                  ;TEST 345       TEST THAT IN MODE 2, BAD ADDRESS REFERENCE CAUSES BUS ERROR.
6778                                  ;*****************************************************************************************
6779  024560                          TS345:
6780  024560  012737  024600  000004          MOV     #RETR3,@#RTRAP5 ;SET TRAP RETURN ADDR
6781  024566  012700  177700                  MOV     #177700,R0      ;STORES BAD MEMORY REFERENCE
6782  024572  012720  001234                  MOV     #1234,(R0)+     ;BAD ADDR REFERENCE, TRAP TO LOC 4
6783  024576  104000                          EMT                     ;ADDRESSING 177700 DID NOT CAUSE TRAP
6784  024600  022700  177702          RETR3:  CMP     #177702,R0      ;WAS R0 INCREMENTED?
6785  024604  001401                          BEQ     TS346
6786  024606  104000                          EMT                     ;R0 WAS NOT INCREMENTED
6787                                          ;************************************************************
6788                                          ;
6789                                          ;AFTER THE FIRST BUS ERROR WAS ENCOUNTERED, AN ATTEMPT WAS MADE
6790                                          ;TO PUSH PC AND PS INTO THE STACK. HOWEVER, IF THE STACK POINTER
6791                                          ;WAS BAD, A BOUBLE BUS ERROR OCCURED.  THE STACK POINTER WOULD
6792                                          ;THEN BE SET TO LOCATION 4, OLD PC AND PS WERE PUSHED INTO
6793                                          ;LOCATIONS 0 AND 2. THE PROCESSOR WOULD TRAP TO 4 AND CONTINUE
6794                                          ;EXECUTION.
6795                                          ;
6796                                  ;*****************************************************************************************
6797                                  ;TEST 346       TEST FOR DOUBLE BUS ERROR.
6798                                  ;*****************************************************************************************
6799  024610                          TS346:
6800  024610  012767  024652  153166          MOV     #DBE1,RTRAP5    ;SET TRAP RETURN ADDR
6801  024616  012737  000340  000006          MOV     #340,@#6        ;SET UP PS
6802  024624  012767  024650  153156          MOV     #DBE2,RTRAP     ;SET TRAP RETURN ADDR
6803  024632  012737  000340  000012          MOV     #340,@#12       ;SET UP PS
6804  024640  012706  177700                  MOV     #177700,SP      ;SET ILLEGAL SP
6805  024644  000077                  DBE:    TRAPA                   ;ILLEGAL INSTRUCTION
6806  024646  104000                          EMT                     ;DOUBLE BUS ERROR DID NOT CAUSE TRAP
```

```
6807  024650                          DBE2:
6808  024650  104000                          EMT                     ;TRAP TO WRONG LOCATION
6809  024652  022737  024646  000000  DBE1:   CMP     #DBE+2,@#0      ;OLD PC GOT SAVED?
6810  024660  001401                          BEQ     DBE3
6811  024662  104000                          EMT                     ;OLD PC DID NOT GET SAVEDD
6812  024664  022737  000340  000002  DBE3:   CMP     #340,@#2        ;CORRECT PS SAVED?
6813  024672  001401                          BEQ     DBE4
6814  024674  104000                          EMT                     ;CORRECT PS DID NOT GET SAVE
6815  024676  022706  000000          DBE4:   CMP     #0,SP           ;SP POINTS TO LOC 0?
6816  024702  001401                          BEQ     DBE5
6817  024704  104000                          EMT                     ;SP IS NOT POINTING TO LOC 0
6818  024706  012706  001000          DBE5:   MOV     #STBOT,SP       ;RESET SP
6819  024712  012767  021336  153064          MOV     #TO4,4          ;RESET VECTOR 4
6820  024720  012767  021340  153062          MOV     #TO10,10        ;RESET VECTOR 10
6821
6822                                          ;*****************************************************************
6823                                          ;THIS TEST WILL CHECK THE SERVICE ROUTINE FOR A CONTROL CHIP ERROR.
6824                                          ;THIS IS DONE BY EXECUTING INSTRUCTIONS WHICH JUMP TO NON-EXISTENT
6825                                          ;CONTROL-CHIP. THE TEST EXECUTES AN FIS INSTRUCTION WHICH
6826                                          ;IS ILLEGAL ON ALL PROCESSORS USING THE DCF11-A CHIP SET.
6827                                          ;A CTLERR TRAPS TO LOCATION 10.
6828                                          ;THE RESET LINE IS ALSO ASSERTED FOR 1 CYCLE.
6829                                ;*************************************************************************
6830                                ;TEST 347       TEST CTLERR SERVICE ROUTINE
6831                                ;*************************************************************************
6832  024726                        TS347:
6833
6834  024726  012706  001000                  MOV     #STBOT,R6       ;INIT STACK POINTER
6835  024732  012737  024752  000010          MOV     #1$,@#10                ;SET UP RETURN ADDR FROM TRAP
6836  024740  012737  000340  000012          MOV     #340,@#12       ;SET TRAP PRIORITY=7
6837  024746  075006                          FADD    R6              ;EXECUTE FIS INSTR..SHOULD CAUSE CTLERR
6838  024750  000000                          HALT                    ;DID NOT TRAP..CHECK CSEL LINE
6839  024752  012706  001000          1$:     MOV     #STBOT,R6       ;RE-INIT STACK POINTER
6840  024756  012767  021340  153024          MOV     #TO10,10        ;RESET VECTOR 10
6841
6842                                ;*************************************************************************
6843                                ;TEST 350       TEST THAT ALL RESERVED INSTRUCTIONS TRAP
6844                                ;*************************************************************************
6845  024764                        TS350:
6846  024764  042767  000100  152572          BIC     #100,TTCSR
6847                                                                  ; SET UP TO SEE IF
6848  024772  013767  000010  000042          MOV     @#10,TENSAVE    ;  THIS PROCESSOR HAS THE
6849  025000  012737  025044  000010          MOV     #TRAP10,@#10    ;  FLOATING POINT OPTION
6850  025006  170127  000000                  LDFPS   #0              ;DO A FPP INSTRUCTION
6851                                                                  ;IF NO TRAP FPP INSTALLED
6852  025012  013767  025366  000356          MOV     @#FPP,FINISH    ;SO RESET END OF TABLE POINTER
6853  025020  000411                          BR      AROUND          ; THE FOLLOWING
6854
6855                                ;* IF NO CIS OPTION TRAP TO HERE
6856  025022  042777  000040  174354  CISTRP: BIC     #40,@SWR        ;CLEAR CIS OPTION IN SWR
6857  025030  012716  025076                  MOV     #CONCIS,(SP)    ;CHANGE RETURN ADDRESS TO CONCIS LOCATION
6858  025034  000002                          RTI                     ;RETURN
6859  025036  000000                  CISADR: .WORD   0               ;DATA FOR CIS
6860  025040  000000                          .WORD   0               ;               INSTRUCTION
6861  025042  000000                  TENSAVE:.WORD   0               ; A PLACE TO STORE CONTENTS OF 10
6862  025044                          TRAP10:                         ; LEAVE THE TABLE ALONE
```

```
6863
6864  025044                                AROUND:                         ;  CONTINUATION POINT
6865  025044  012737  000246  000244                MOV     #246,@#244      ;  RESTORE THE TRAP VECTOR
6866  025052  012737  025022  000010                MOV     #CISTRP,@#10    ;SET UP TO SEE IF THIS HAS THE CIS OPTION
6867  025060  076144                                .WORD   076144          ;EXECUTE A CMPCI INSTRUCTION
6868  025062  025036                                .WORD   CISADR          ;OPERANDS
6869  025064  025036                                .WORD   CISADR          ;         FOR CIS
6870  025066  000000                                .WORD   0               ;                INSTRUCTION
6871  025070  052777  000040  174306                BIS     #40,@SWR        ;SET CIS PRESENT BIT
6872  025076  016737  177740  000010  CONCIS:      MOV     TENSAVE,@#10    ; RESTORE THE ILLEGAL INST. VECTOR
6873  025104  012703  025256                        MOV     #TABLE,TAB      ;TABLE POINTER
6874  025110  012305                    GIN1:       MOV     (TAB)+,FIRST    ;FIRST OR CURRENT INSTRUCTION
6875  025112  012301                                MOV     (TAB)+,LAST     ;LAST INSTRUCTION OR GROUP
6876  025114  020537  025332                        CMP     FIRST,@#CIS
6877  025120  001007                                BNE     1$
6878  025122  032777  000040  174254                BIT     #40,@SWR
6879  025130  001403                                BEQ     1$
6880  025132  012703  025366                        MOV     #FPP,TAB
6881  025136  000764                                BR      GIN1
6882  025140  020567  000232                1$:     CMP     FIRST,FINISH    ;TESTED ALL
6883  025144  001415                                BEQ     GIN3            ;YES BRANCH
6884  025146  010567  000226                        MOV     FIRST,INST      ;SET UP INST
6885  025152  005267  000222                GIN2:   INC     INST
6886  025156  012767  025212  152624                MOV     #RET,10         ;SET UP RETURN FROM TRAP
6887  025164  012706  001000                        MOV     #STBOT,SP       ;SET UP STACK POINTER
6888  025170  005067  152602                        CLR     CC              ;CLEAR PRIORITY
6889  025174  000167  000200                        JMP     INST            ;EXECUTE RESERVED INSTRUCTION
6890  025200  012767  021340  152602  GIN3:       MOV     #T010,10        ;RESET VECTOR 10
6891  025206  000167  000252                        JMP     THRPRT          ;JUMP TO EIS TEST
6892
6893                                    ;TRAPPING SHOULD SEND YOU HERE
6894  025212  020627  000774                RET:    CMP     SP,#STBOT-4     ;TEST DECREMENT OF SP
6895  025216  001401                                BEQ     RET1
6896  025220  104000                                EMT                     ;WRONG DECREMENT
6897  025222  026727  153546  025402        RET1:   CMP     STBOT-4,#INST+2 ;LOC OF INST UNINCREMENTED
6898  025230  001401                                BEQ     RET2
6899  025232  104000                                EMT                     ;INST INC ON TRAP
6900  025234  005767  153536                RET2:   TST     STBOT-2
6901  025240  001401                                BEQ     RET3
6902  025242                                RET4:
6903  025242  104000                                EMT                     ;CONDITION CODES SET ON TRAP OR WRONG $TSTNM
6904  025244  026701  000130                RET3:   CMP     INST,LAST
6905  025250  001717                                BEQ     GIN1            ;SET UP NEW GROUP
6906  025252  000167  177674                        JMP     GIN2            ;FINISH OLD GROUP
6907                                                                        ;END OF INSTRUCTION GROUP
6908  025256  000007                        TABLE:  7                       ;END OF OPERATE
6909  025260  000077                                77
6910  025262  000207                                207                     ;RTS,RT1,JMP
6911  025264  000227                                227
6912  025266  006777                                6777
6913  025270  007777                                7777
6914  025272  075037                                075037
6915  025274  076017                                76017
6916  025276  076032                                76032
6917  025300  076037                                76037
6918  025302  076045                                76045
```

```
 6919  025304  076047                    76047
 6920  025306  076077                    76077
 6921  025310  076127                    76127
 6922  025312  076132                    76132
 6923  025314  076137                    76137
 6924  025316  076145                    76145
 6925  025320  076147                    76147
 6926  025322  076157                    76157
 6927  025324  076167                    76167
 6928  025326  076177                    76177
 6929  025330  076777                    76777
 6930  025332  076017            CIS:    76017
 6931  025334  076032                    76032
 6932  025336  076037                    76037
 6933  025340  076045                    76045
 6934  025342  076047                    76047
 6935  025344  076077                    76077
 6936  025346  076127                    76127
 6937  025350  076132                    76132
 6938  025352  076137                    76137
 6939  025354  076145                    76145
 6940  025356  076147                    76147
 6941  025360  076157                    76157
 6942  025362  076167                    76167
 6943  025364  076177                    76177
 6944  025366  167777            FPP:    167777                  ;  START OF THE FPP INSTRUCTIONS
 6945  025370  177700                    177700
 6946  025372  177716                    177716
 6947  025374  177777                    177777
 6948  025376  025376            FINISH: .                       ;END FLAG
 6949  025400  000000            INST:   HALT                    ;WILL CONTINUE RESERVED INST
 6950  025402  000000                    HALT                    ;SHOULD TRAP TO LOC 10
 6951  025404  000000                    HALT                    ;LOC 10 SHOULD SEND YOU TO
 6952  025406  000000                    HALT                    ;RET
 6953  025410  000000                    HALT
 6954                            .SBTTL ** STARTING OF EIS TEST **
 6955
 6956
 6957          000000            DUMMY=  0
 6958          000051            F=      51
 6959          000176            N=      176
 6960
 6961  025412                    COUNT:
 6962          025414                    .=COUNT+2
 6963  025414                    PSWORD:
 6964          025416                    .=PSWORD+2
 6965  025416                    TEMP1:
 6966          025420                    .=TEMP1+2
 6967  025420                    TEMP2:
 6968          025422                    .=TEMP2+2
 6969  025422                    TEMP3:
 6970          025424                    .=TEMP3+2
 6971  025424                    TEMP4:
 6972          025426                    .=TEMP4+2
 6973  025426  000000            TEMP5:  .WORD
 6974  025430  000000            TEMP6:  .WORD
```

```
 6975  025432  177771          S1:     -7
 6976  025434  025432          S2:     S1
 6977  025436  177772          S3:     -6
 6978  025440  177777          S4:     -1
 6979  025442  040000          S5:     40000
 6980  025444  025442          S6:     S5
 6981  025446  040000          S7:     40000
 6982  025450  177776          S8:     -2
 6983  025452  000002          S9:     2
 6984  025454  025452          S10:    S9
 6985  025456  000002          S11:    2
 6986  025460  177566          $TPB:   177566
 6987  025462  177564          $TPS:   177564
 6988
 6989
 6990
 6991
 6992
 6993
```

```
                                                                D 11
 6994  025464                          THRPRT:
 6995
 6996  025464  012705  001004                  MOV     #$TESTN,R5      ;MAKE R5 POINT TO WHERE TEST # IS SAVED
 6997  025470  005037  025412                  CLR     @#COUNT         ;CLEAR THE COUNTER
 6998  025474  012715  000001                  MOV     #1,(R5)         ;INITIALIZE TEST NUMBER
 6999  025500  012706  001000                  MOV     #STBOT,SP       ;** STACK AT STBOT **
 7000  025504  012737  000001  025416  2$:     MOV     #1,@#TEMP1      ;TEMP1=1
 7001  025512  005037  025420                  CLR     @#TEMP2         ;TEMP2=0
 7002  025516  012737  000001  025422          MOV     #1,@#TEMP3      ;TEMP3=1
 7003  025524  005037  025424                  CLR     @#TEMP4         ;TEMP4=0
 7004  025530  106427  000000                  MTPS    #0
 7005
 7006
```

```
7007
7008                                    ;*********************************
7009                                    ;     ASH INSTRUCTION TESTS
7010                                    ;*********************************
7011
7012
7013
7014
7015                                            ;*************
7016                                            ; TESTS 1-36
7017                                            ;*************
7018
7019
7020  025534  013700  025416        ASTART: MOV     @#TEMP1,%0      ;LOAD R0 WITH THE CONTENTS OF TEMP1
7021  025540  032737  000001  001006        BIT     #1,@#$PASS      ;IS IT AN EVEN PASS ?
7022  025546  001004                        BNE     2$              ;IF NOT THEN GO TO 2$
7023  025550  013701  025420                MOV     @#TEMP2,R1      ;OTHERWISE EXECUTE THE INSTRUCTION
7024                                                                ;IN MODE 0 USING R1
7025  025554  072001                        ASH     R1,R0
7026  025556  000402                        BR      4$
7027  025560  072067  177634        2$:     ASH     TEMP2,%0        ;SHIFT R0 BY THE NUMBER SPECIFIED BY TEMP2
7028  025564  106737  025414        4$:     MFPS    @#PSWORD        ;SAVE PS
7029  025570  123737  025424  025414        CMPB    @#TEMP4,@#PSWORD;IS THE PS = TEMP4 ?
7030  025576  001401                        BEQ     11$
7031  025600  104000                        EMT                     ;THE PS IS NOT EQUAL TO 0
7032  025602  005237  025412        11$:    INC     @#COUNT         ;INCREMENT THE COUNTER
7033  025606  023700  025422                CMP     @#TEMP3,%0      ;IS THE RESULT IN R0 EQUAL TO TEMP3?
7034  025612  001401                        BEQ     12$
7035  025614                        6$:
7036  025614  104000                        EMT                     ;EITHER INCORRECT R0 OR INCORRECT SEQUENCE
7037  025616  021537  025412        12$:    CMP     (R5),@#COUNT    ;IS THE TEST NUMBER EQUAL TO THE
7038                                                                ;COUNTER?
7039  025622  001374                        BNE     6$              ;IF NOT GO TO THE HLT ABOVE
7040  025624  005215                        INC     (R5)
7041  025626  021527  000037                CMP     (R5),#37        ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT
7042                                                                ;BY 14. AND RIGHT BY 14.?
7043  025632  002011                        BGE     8$
7044  025634  005237  025420                INC     @#TEMP2
7045  025640  006367  177556                ASL     TEMP3           ;SHIFT TEMP3 LEFT.
7046  025644  021527  000020                CMP     (R5),#20        ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
7047  025650  001004                        BNE     REGR1
7048  025652  000167  000670                JMP     NEGAT           ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
7049  025656  004767  000712        8$:     JSR     PC,TST37        ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
7050  025662  013701  025416        REGR1:  MOV     @#TEMP1,%1      ;LOAD R1 WITH THE CONTENTS OF TEMP1
7051  025666  032737  000001  001006        BIT     #1,@#$PASS      ;IS IT AN EVEN PASS ?
7052  025674  001004                        BNE     2$              ;IF NOT THEN GO TO 2$
7053  025676  013702  025420                MOV     @#TEMP2,R2      ;OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
7054  025702  072102                        ASH     R2,R1           ;USING R1
7055  025704  000402                        BR      4$
7056  025706  072167  177506        2$:     ASH     TEMP2,%1        ;SHIFT R1 BY THE NUMBER SPECIFIED BY TEMP2
7057  025712  106737  025414        4$:     MFPS    @#PSWORD        ;SAVE PS
7058  025716  123737  025424  025414        CMPB    @#TEMP4,@#PSWORD;IS THE PS = TEMP4 ?
7059  025724  001401                        BEQ     11$
7060  025726  104000                        EMT                     ;THE PS IS NOT EQUAL TO 0
7061  025730  005237  025412        11$:    INC     @#COUNT         ;INCREMENT THE COUNTER
7062  025734  023701  025422                CMP     @#TEMP3,%1      ;IS THE RESULT IN R1 EQUAL TO TEMP3?
```

```
7063  025740  001401                          BEQ     12$
7064  025742                          6$:
7065  025742  104000                          EMT                             ;EITHER INCORRECT R1 OR INCORRECT SEQUENCE
7066  025744  021537  025412          12$:    CMP     (R5),@#COUNT            ;IS THE TEST NUMBER EQUAL TO THE COUNTER?
7067  025750  001374                          BNE     6$                      ;IF NOT GO TO THE HLT ABOVE
7068  025752  005215                          INC     (R5)
7069  025754  021527  000037                  CMP     (R5),#37                ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT
7070                                                                          ;BY 14. AND RIGHT BY 14.?
7071  025760  002011                          BGE     8$
7072  025762  005237  025420                  INC     @#TEMP2
7073  025766  006367  177430                  ASL     TEMP3                   ;SHIFT TEMP3 LEFT
7074  025772  021527  000020                  CMP     (R5),#20                ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
7075  025776  001004                          BNE     REGR2
7076  026000  000167  000542                  JMP     NEGAT                   ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
7077  026004  004767  000564          8$:     JSR     PC,TST37                ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
7078  026010  013702  025416          REGR2:  MOV     @#TEMP1,%2              ;LOAD R2 WITH THE CONTENTS OF TEMP1
7079  026014  032737  000001  001006        BIT     #1,@#$PASS              ;IS IT AN EVEN PASS ?
7080  026022  001004                          BNE     2$                      ;IF NOT THEN GO TO 2$
7081  026024  013703  025420                  MOV     @#TEMP2,R3              ;OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
7082  026030  072203                          ASH     R3,R2                   ;USING R2
7083  026032  000402                          BR      4$
7084  026034  072267  177360          2$:     ASH     TEMP2,%2                ;SHIFT R2 BY THE NUMBER SPECIFIED BY TEMP2
7085  026040  106737  025414          4$:     MFPS    @#PSWORD                ;SAVE PS
7086  026044  123737  025424  025414          CMPB    @#TEMP4,@#PSWORD        ;IS THE PS = TEMP4 ?
7087  026052  001401                          BEQ     11$
7088  026054  104000                          EMT                             ;THE PS IS NOT EQUAL TO 0
7089  026056  005237  025412          11$:    INC     @#COUNT
7090  026062  023702  025422                  CMP     @#TEMP3,%2              ;IS THE RESULT IN R2 EQUAL TO TEMP3?
7091  026066  001401                          BEQ     12$
7092  026070                          6$:
7093  026070  104000                          EMT                             ;EITHER INCORRECT R2 OR INCORRECT SEQUENCE
7094  026072  021537  025412          12$:    CMP     (R5),@#COUNT            ;IS THE TEST NUMBER EQUAL TO THE COUNTER?
7095  026076  001374                          BNE     6$                      ;IF NOT GO TO THE HLT ABOVE
7096  026100  005215                          INC     (R5)
7097  026102  021527  000037                  CMP     (R5),#37                ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED
7098                                                                          ;LEFT BY 14, AND RIGHT BY 14.?
7099  026106  002011                          BGE     8$
7100  026110  005237  025420                  INC     @#TEMP2
7101  026114  006367  177302                  ASL     TEMP3                   ;SHIFTED TEMP3 LEFT
7102  026120  021527  000020                  CMP     (R5),#20                ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
7103  026124  001004                          BNE     REGR3
7104  026126  000167  000414                  JMP     NEGAT                   ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
7105  026132  004767  000436          8$:     JSR     PC,TST37                ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
7106  026136  013703  025416          REGR3:  MOV     @#TEMP1,%3              ;LOAD R3 WITH THE CONTENTS OF TEMP1
7107  026142  032737  000001  001006        BIT     #1,@#$PASS              ;IS IT AN EVEN PASS ?
7108  026150  001004                          BNE     2$                      ;IF NOT THEN GO TO 2$
7109  026152  013704  025420                  MOV     @#TEMP2,R4              ;OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
7110  026156  072304                          ASH     R4,R3                   ;USING R3
7111  026160  000402                          BR      4$
7112  026162  072367  177232          2$:     ASH     TEMP2,%3                ;SHIFT R3 BY THE NUMBER SPECIFIED BY TEMP2
7113  026166  106737  025414          4$:     MFPS    @#PSWORD                ;SAVE PS
7114  026172  123737  025424  025414          CMPB    @#TEMP4,@#PSWORD        ;IS THE PS = TEMP4 ?
7115  026200  001401                          BEQ     11$
7116  026202  104000                          EMT                             ;THE PS IS NOT EQUAL TO 0.
7117  026204  005237  025412          11$:    INC     @#COUNT
7118  026210  023703  025422                  CMP     @#TEMP3,%3              ;IS THE RESULT IN R3 EQUAL TO TEMP3?
```

```
7119  026214  001401                          BEQ     12$
7120  026216                          6$:
7121  026216  104000                          EMT                             ;EITHER INCORRECT R3 OR INCORRECT SEQUENCE
7122  026220  021537  025412          12$:    CMP     (R5),@#COUNT            ;IS THE TEST NUMBER EQUAL TO THE COUNTER?
7123  026224  001374                          BNE     6$                      ;IF NOT GO TO THE HLT ABOVE
7124  026226  005215                          INC     (R5)
7125  026230  021527  000037                  CMP     (R5),#37                ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED
7126                                                                          ;LEFT BY 14, AND RIGHT BY 14.?
7127  026234  002010                          BGE     8$
7128  026236  005237  025420                  INC     @#TEMP2
7129  026242  006367  177154                  ASL     TEMP3                   ;SHIFT TEMP3 LEFT?
7130  026246  021527  000020                  CMP     (R5),#20                ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
7131  026252  001003                          BNE     REGR4
7132  026254  000534                          BR      NEGAT                   ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
7133  026256  004767  000312          8$:     JSR     PC,TST37                ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
7134  026262  013704  025416          REGR4:  MOV     @#TEMP1,%4              ;LOAD R4 WITH THE CONTENTS OF TEMP1
7135  026266  010501                          MOV     R5,R1                   ;SAVE R5
7136  026270  032737  000001  001006        BIT     #1,@#$PASS              ;IS IT AN EVEN PASS ?
7137  026276  001004                          BNE     2$                      ;IF NOT THEN GO TO 2$
7138  026300  013705  025420                  MOV     @#TEMP2,R5              ;OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
7139  026304  072405                          ASH     R5,R4                   ;USING R4
7140  026306  000402                          BR      4$
7141  026310  072467  177104          2$:     ASH     TEMP2,%4                ;SHIFT R4 BY THE NUMBER SPECIFIED BY TEMP2
7142  026314  106737  025414          4$:     MFPS    @#PSWORD                ;SAVE PS
7143  026320  123737  025424  025414          CMPB    @#TEMP4,@#PSWORD        ;IS PS = TEMP4 ?
7144  026326  001401                          BEQ     11$
7145  026330  104000                          EMT                             ;THE PS IS NOT EQUAL TO 0
7146  026332  005237  025412          11$:    INC     @#COUNT
7147  026336  023704  025422                  CMP     @#TEMP3,%4              ;IS THE RESULT IN R4 EQUAL TO TEMP3?
7148  026342  001401                          BEQ     12$
7149  026344                          6$:
7150  026344  104000                          EMT                             ;EITHER INCORRECT R4 OR INCORRECT SEQUENCE
7151  026346  010105                  12$:    MOV     R1,R5                   ;RESTORE R5
7152  026350  021537  025412                  CMP     (R5),@#COUNT            ;IS THE TEST NUMBER EQUAL TO THE COUNTER?
7153  026354  001373                          BNE     6$                      ;IF NOT GO TO THE HLT ABOVE
7154  026356  005215                          INC     (R5)
7155  026360  021527  000037                  CMP     (R5),#37                ;HAS THE CONTENTS OF REGISTERS BEEN
7156                                                                          ;SHIFTED LEFT BY 14. AND RIGHT BY 14.?
7157  026364  002010                          BGE     8$
7158  026366  005237  025420                  INC     @#TEMP2
7159  026372  006367  177024                  ASL     TEMP3                   ;SHIFT TEMP3 LEFT
7160  026376  021527  000020                  CMP     (R5),#20                ;HAS THE CONTENTS OF REGISTER BEEN SHIFTED BY 14.?
7161  026402  001003                          BNE     REGR5
7162  026404  000460                          BR      NEGAT                   ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
7163  026406  004767  000162          8$:     JSR     PC,TST37                ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
7164  026412  010501                  REGR5:  MOV     R5,R1                   ;SAVE R5
7165  026414  013705  025416                  MOV     @#TEMP1,%5              ;LOAD R5 WITH THE CONTENTS OF TEMP1
7166  026420  032737  000001  001006        BIT     #1,@#$PASS              ;IS IT AN EVEN PASS ?
7167  026426  001004                          BNE     2$                      ;IF NOT THEN GO TO 2$
7168  026430  013700  025420                  MOV     @#TEMP2,R0              ;OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
7169  026434  072500                          ASH     R0,R5                   ;USING R5
7170  026436  000402                          BR      4$
7171  026440  072567  176754          2$:     ASH     TEMP2,%5                ;SHIFT R5 BY THE NUMBER SPECIFIED BY TEMP2
7172  026444  106737  025414          4$:     MFPS    @#PSWORD                ;SAVE PS
7173  026450  123737  025424  025414          CMPB    @#TEMP4,@#PSWORD        ;IS PS = TEMP4 ?
7174  026456  001401                          BEQ     11$
```

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7175  026460  104000                        EMT                     ;THE PS IS NOT EQUAL TO 0.
7176  026462  005237  025412        11$:    INC     @#COUNT
7177  026466  023705  025422                CMP     @#TEMP3,%5      ;IS THE RESULT IN R5 FQUAL TO TEMP3?
7178  026472  001401                        BEQ     12$
7179  026474                        6$:
7180  026474  104000                        EMT                     ;EITHER INCORRECT R5 OR INCORRECT SEQUENCE
7181  026476  021137  025412        12$:    CMP     (R1),@#COUNT    ;IS THE TEST NUMBER EQUAL TO THE COUNTER?
7182  026502  001374                        BNE     6$              ;IF NOT GO TO THE HLT ABOVE
7183  026504  010105                        MOV     R1,R5           ;RESTORE R5
7184  026506  005215                        INC     (R5)
7185  026510  021527  000037                CMP     (R5),#37        ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED
7186                                                                ;LEFT BY 14. AND RIGHT BY 14.?
7187  026514  002010                        BGE     8$              ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
7188  026516  005237  025420                INC     @#TEMP2
7189  026522  006367  176674                ASL     TEMP3           ;SHIFT TEMP3 LEFT
7190  026526  021527  000020                CMP     (R5),#20        ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
7191  026532  001405                        BEQ     NEGAT           ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
7192  026534  000402                        BR      10$
7193  026536  004767  000032        8$:     JSR     PC,TST37
7194  026542  000167  176766        10$:    JMP     ASTART          ;GO BACK TO START
7195  026546  012737  040000  025416 NEGAT:  MOV     #40000,@#TEMP1  ;TEMP1=40000
7196  026554  012737  177762  025420        MOV     #177762,@#TEMP2 ;TEMP2=1.,762
7197  026562  012737  000001  025422        MOV     #1,@#TEMP3      ;TEMP3=1
7198  026570  000167  176740                JMP     ASTART
7199  026574  021527  000037        TST37:  CMP     (R5),#37        ;IS IT TEST 37?
7200  026600  001013                        BNE     TST40           ;IF NOT THEN TRY TEST 40
7201  026602  005037  025416                CLR     @#TEMP1         ;0
7202  026606  012737  000020  025420        MOV     #16.,@#TEMP2    ;SHIFTED BY 16
7203  026614  005037  025422                CLR     @#TEMP3         ;IS=0
7204  026620  012737  000004  025424        MOV     #4,@#TEMP4      ;AND PS=4
7205  026626  000207                        RTS     PC
7206  026630  021527  000040        TST40:  CMP     (R5),#40        ;IS IT TEST 40?
7207  026634  001003                        BNE     TST41           ;IF NOT THEN TRY TEST 41
7208  026636  005037  025420                CLR     @#TEMP2         ;0 SHIFTED BY 0=0 AND PS=4
7209  026642  000207                        RTS     PC
7210  026644  021527  000041        TST41:  CMP     (R5),#41        ;IS IT TEST 41?
7211  026650  001004                        BNE     TST42           ;IF NOT THEN TRY TEST 42
7212  026652  012737  177760  025420        MOV     #-16.,@#TEMP2   ;0 SHIFTED BY -16.=0 AND PS=4
7213  026660  000207                        RTS     PC
7214  026662  021527  000042        TST42:  CMP     (R5),#42        ;IS IT TEST 42?
7215  026666  001013                        BNE     TST43           ;IF NOT THEN TRY TEST 43
7216  026670  012737  100000  025416        MOV     #100000,@#TEMP1 ;100000
7217  026676  005237  025420                INC     @#TEMP2         ;SHIFTED BY -15
7218  026702  005337  025422                DEC     @#TEMP3         ;IS=-1
7219  026706  012737  000010  025424        MOV     #10,@#TEMP4             ;AND PS=10
7220  026714  000207                        RTS     PC
7221  026716  021527  000043        TST43:  CMP     (R5),#43        ;IS IT TEST 43?
7222  026722  001012                        BNE     TST44           ;IF NOT THEN IF NOT THEN TRY TEST 44
7223  026724  012737  125252  025416        MOV     #125252,@#TEMP1 ;125252
7224  026732  012737  177777  025420        MOV     #-1,@#TEMP2     ;SHIFTED BY -1
7225  026740  012737  152525  025422        MOV     #152525,@#TEMP3 ;IS=152525 AND PS=10
7226  026746  000207                        RTS     PC
7227  026750  021527  000044        TST44:  CMP     (R5),#44        ;IS IT TEST 44?
7228  026754  001012                        BNE     TST45           ;IF NOT THEN TRY TEST 45
7229  026756  012737  000001  025420        MOV     #1,@#TEMP2      ;125252 SHIFTED BY 1
7230  026764  012737  052524  025422        MOV     #52524,@#TEMP3  ;IS=52524
```

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7231  026772  012737  000003  025424          MOV     #3,@#TEMP4      ;AND PS=3
7232  027000  000207                          RTS     PC
7233  027002  021527  000045          TST45:   CMP     (R5),#45        ;IS IT TEST 45?
7234  027006  001012                          BNE     TST46           ;IF NOT THEN TRY TEST 46
7235  027010  012737  177776  025420          MOV     #-2,@#TEMP2     ;125252 SHIFTED BY -2
7236  027016  012737  165252  025422          MOV     #165252,@#TEMP3 ;IS=165252
7237  027024  012737  000011  025424          MOV     #11,@#TEMP4     ;AND PS=11
7238  027032  000207                          RTS     PC
7239  027034  021527  000046          TST46:   CMP     (R5),#46        ;IS IT TEST 46?
7240  027040  001014                          BNE     TST47           ;IF NOT THEN TRY TEST 47
7241  027042  012737  177777  025416          MOV     #-1,@#TEMP1     ;-1
7242  027050  012737  000020  025420          MOV     #16.,@#TEMP2    ;SHIFTED BY 15.
7243  027056  005037  025422                  CLR     @#TEMP3         ;IS=0
7244  027062  012737  000007  025424          MOV     #7,@#TEMP4      ;AND PS=7
7245  027070  000207                          RTS     PC
7246  027072  021527  000047          TST47:   CMP     (R5),#47        ;IS IT TEST 47?
7247  027076  001011                          BNE     TST50           ;IF NOT THEN TRY TEST 50
7248  027100  005337  025420                  DEC     @#TEMP2         ;-1 SHIFTED BY 15
7249  027104  012737  100000  025422          MOV     #100000,@#TEMP3 ;IS=100000
7250  027112  012737  000011  025424          MOV     #11,@#TEMP4     ;AND PS=11
7251  027120  000207                          RTS     PC
7252  027122  021527  000050          TST50:   CMP     (R5),#50        ;IS IT TEST 50
7253  027126  001007                          BNE     ENT51           ;IF NOT THEN TRY TEST 51
7254  027130  012737  137777  025416          MOV     #137777,@#TEMP1 ;137777 SHIFTED BY 15. IS=100000
7255  027136  012737  000013  025424          MOV     #13,@#TEMP4     ;AND PS=13
7256  027144  000207                          RTS     PC
7257  027146  021527  000051          ENT51:   CMP     (R5),#51        ;IS IT ENTERING TEST 51?
7258  027152  001401                          BEQ     1$
7259  027154  104000                          EMT                     ;TEST NUMBER GOOFED
7260
7261  027156  005726                  1$:     TST     (SP)+           ;RESTORE STACK POINTER
7262  027160  012704  177771                  MOV     #-7,%4
7263  027164  012702  025432                  MOV     #S1,%2
7264  027170  012703  025434                  MOV     #S2,%3
7265                                  ;*****************************************************************
7266                                  ;TEST:51   11/34   ASH     125252 SHIFTED BY #5 = 52500  PS = 3
7267                                  ;*****************************************************************
7268
7269  027174  012701  125252          TST51:  MOV     #125252,%1      ;LOAD R1 WITH 125252
7270  027200  072127  000005                  ASH     #5,%1           ;SHIFT R1 BY #5
7271  027204  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
7272  027210  122737  000003  025414          CMPB    #3,@#PSWORD     ;IS THE PS 3?
7273  027216  001401                          BEQ     11$
7274  027220  104000                          EMT                     ;THE PS IS NOT EQUAL TO 3
7275  027222  022701  052500          11$:    CMP     #52500,%1       ;IS THE RESULT 52500?
7276  027226  001401                          BEQ     12$
7277  027230  104000                          EMT                     ;R1 IS NOT EQUAL TO 52500 OR INCORRECT SEQUENCE
7278  027232  005215                  12$:    INC     (R5)
7279
7280
7281
7282                                  ;*****************************************************************
7283                                  ;TEST:52   11/34   ASH     125252 SHIFTED BY @S2 = 177525  PS = 10
7284                                  ;*****************************************************************
7285
7286  027234  012700  125252          TST52:  MOV     #125252,%0      ;LOAD R0 WITH 125252
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 7287  027240  072077  176170            ASH     @S2,%0          ;SHIFT R0 BY @S2
 7288  027244  106737  025414            MFPS    @#PSWORD        ;SAVE PS
 7289  027250  122737  000010  025414    CMPB    #10,@#PSWORD    ;IS THE PS 10?
 7290  027256  001401                    BEQ     11$
 7291  027260  104000                    EMT                     ;THE PS IS NOT EQUAL TO 10
 7292  027262  022700  177525    11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
 7293  027266  001401                    BEQ     12$
 7294  027270  104000                    EMT                     ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
 7295  027272  005215    12$:    INC     (R5)
 7296
 7297
 7298
 7299                    ;*************************************************************************
 7300                    ;TEST:53   11/34   ASH     125252 SHIFTED BY @#S1 = 177525  PS = 10
 7301                    ;*************************************************************************
 7302
 7303  027274  012700  125252    TST53:  MOV     #125252,%0      ;LOAD R0 WITH 125252
 7304  027300  072037  025432            ASH     @#S1,%0         ;SHIFT R0 BY @#S1
 7305  027304  106737  025414            MFPS    @#PSWORD        ;SAVE PS
 7306  027310  122737  000010  025414    CMPB    #10,@#PSWORD    ;IS THE PS 10?
 7307  027316  001401                    BEQ     11$
 7308  027320  104000                    EMT                     ;THE PS IS NOT EQUAL TO 10
 7309  027322  022700  177525    11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
 7310  027326  001401                    BEQ     12$
 7311  027330  104000                    EMT                     ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
 7312  027332  005215    12$:    INC     (R5)
 7313
 7314
 7315
 7316                    ;*************************************************************************
 7317                    ;TEST:54   11/34   ASH     125252 SHIFTED BY (2) = 177525  PS = 10
 7318                    ;*************************************************************************
 7319
 7320  027334  012700  125252    TST54:  MOV     #125252,%0      ;LOAD R0 WITH 125252
 7321  027340  072012            ASH     (2),%0          ;SHIFT R0 BY (2)
 7322  027342  106737  025414            MFPS    @#PSWORD        ;SAVE PS
 7323  027346  122737  000010  025414    CMPB    #10,@#PSWORD    ;IS THE PS 10?
 7324  027354  001401                    BEQ     11$
 7325  027356  104000                    EMT                     ;THE PS IS NOT EQUAL TO 10
 7326  027360  022700  177525    11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
 7327  027364  001401                    BEQ     12$
 7328  027366  104000                    EMT                     ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
 7329  027370  005215    12$:    INC     (R5)
 7330
 7331
 7332
 7333                    ;*************************************************************************
 7334                    ;TEST:55   11/34   ASH     125252 SHIFTED BY (2)+ = 177525  PS = 10
 7335                    ;*************************************************************************
 7336
 7337  027372  012700  125252    TST55:  MOV     #125252,%0      ;LOAD R0 WITH 125252
 7338  027376  072022            ASH     (2)+,%0         ;SHIFT R0 BY (2)+
 7339  027400  106737  025414            MFPS    @#PSWORD        ;SAVE PS
 7340  027404  122737  000010  025414    CMPB    #10,@#PSWORD    ;IS THE PS 10?
 7341  027412  001401                    BEQ     11$
 7342  027414  104000                    EMT                     ;THE PS IS NOT EQUAL TO 10
```

```
7343  027416  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
7344  027422  001401                          BEQ     12$
7345  027424  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
7346  027426  005215                  12$:    INC     (R5)
7347
7348
7349
7350                                  ;*****************************************************************************
7351                                  ;TEST:56   11/34   ASH     125252 SHIFTED BY -(2) = 177525  PS = 10
7352                                  ;*****************************************************************************
7353
7354  027430  012700  125252          TST56:  MOV     #125252,%0      ;LOAD R0 WITH 125252
7355  027434  072042                          ASH     -(2),%0         ;SHIFT R0 BY -(2)
7356  027436  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
7357  027442  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS THE PS 10?
7358  027450  001401                          BEQ     11$
7359  027452  104000                          EMT                     ;THE PS IS NOT EQUAL TO 10
7360  027454  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
7361  027460  001401                          BEQ     12$
7362  027462  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
7363  027464  005215                  12$:    INC     (R5)
7364
7365
7366
7367                                  ;*****************************************************************************
7368                                  ;TEST:57   11/34   ASH     125252 SHIFTED BY 2(3) = 177252  PS = 11
7369                                  ;*****************************************************************************
7370
7371  027466  012700  125252          TST57:  MOV     #125252,%0      ;LOAD R0 WITH 125252
7372  027472  072063  000002                  ASH     2(3),%0         ;SHIFT R0 BY 2(3)
7373  027476  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
7374  027502  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS THE PS 11?
7375  027510  001401                          BEQ     11$
7376  027512  104000                          EMT                     ;THE PS IS NOT EQUAL TO 11
7377  027514  022700  177252          11$:    CMP     #177252,%0      ;IS THE RESULT 177252?
7378  027520  001401                          BEQ     12$
7379  027522  104000                          EMT                     ;R0 IS NOT EQUAL TO 177252 OR INCORRECT SEQUENCE
7380  027524  005215                  12$:    INC     (R5)
7381
7382
7383
7384                                  ;*****************************************************************************
7385                                  ;TEST:60   11/34   ASH     125252 SHIFTED BY @(3) = 177525  PS = 10
7386                                  ;*****************************************************************************
7387
7388  027526  012700  125252          TST60:  MOV     #125252,%0      ;LOAD R0 WITH 125252
7389  027532  072073  000000                  ASH     @(3),%0         ;SHIFT R0 BY @(3)
7390  027536  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
7391  027542  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS THE PS 10?
7392  027550  001401                          BEQ     11$
7393  027552  104000                          EMT                     ;THE PS IS NOT EQUAL TO 10
7394  027554  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
7395  027560  001401                          BEQ     12$
7396  027562  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
7397  027564  005215                  12$:    INC     (R5)
7398
```

```
                                ;*****************************************************************************
                                ;TEST:61   11/34   ASH     125252 SHIFTED BY @(3)+ = 177525  PS = 10
                                ;*****************************************************************************

027566  012700  125252          TST61:  MOV     #125252,%0      ;LOAD R0 WITH 125252
027572  072033                          ASH     @(3)+,%0        ;SHIFT R0 BY @(3)+
027574  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
027600  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS THE PS 10?
027606  001401                          BEQ     11$
027610  104000                          EMT                     ;THE PS IS NOT EQUAL TO 10
027612  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
027616  001401                          BEQ     12$
027620  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
027622  005215                  12$:    INC     (R5)


                                ;*****************************************************************************
                                ;TEST:62   11/34   ASH     125252 SHIFTED BY @-(3) = 177525  PS = 10
                                ;*****************************************************************************

027624  012700  125252          TST62:  MOV     #125252,%0      ;LOAD R0 WITH 125252
027630  072053                          ASH     @-(3),%0        ;SHIFT R0 BY @-(3)
027632  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
027636  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS THE PS 10?
027644  001401                          BEQ     11$
027646  104000                          EMT                     ;THE PS IS NOT EQUAL TO 10
027650  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
027654  001401                          BEQ     12$
027656  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
027660  005215                  12$:    INC     (R5)
```

```
                                        ;**********************************
                                        ;     ASHC INSTRUCTION TESTS
                                        ;**********************************



                                            ;*************
                                            ;TESTS 63-157
                                            ;*************


 027662  012737  000062  025412          MOV     #62,@#COUNT
 027670  005037  025416                  CLR     @#TEMP1         ;TEMP1=0
 027674  012737  000001  025420          MOV     #1,@#TEMP2      ;TEMP2=1
 027702  005037  025422                  CLR     @#TEMP3         ;TEMP3=0
 027706  005037  025424                  CLR     @#TEMP4         ;TEMP4=0
 027712  012737  000001  025426          MOV     #1,@#TEMP5      ;TEMP5=1
 027720  005037  025430                  CLR     @#TEMP6         ;0 1 SHIFTED BY 0=0 1, PS=0

 027724  010502                  REG01:  MOV     R5,R2           ;SAVE R5
 027726  013700  025416                  MOV     @#TEMP1,%0      ;PLACE THE CONTENTS OF TEMP1 IN REGISTER 0
 027732  013701  025420                  MOV     @#TEMP2,%0!1    ;PLACE THE CONTENTS OF TEMP2 IN REGISTER 1
 027736  000241                          CLC
 027740  032737  000001  001006          BIT     #1,@#$PASS      ;IS IT AN EVEN PASS ?
 027746  001004                          BNE     2$              ;IF NOT THEN GO TO 2$
 027750  013705  025422                  MOV     @#TEMP3,R5      ;OTHERWISE EXECUTE ASHC INSTRUCTION IN MODE 0
 027754  073005                          ASHC    R5,R0           ;USING R0
 027756  000402                          BR      4$
 027760  073067  175436          2$:     ASHC    TEMP3,%0        ;ASHC REGISTER 0 BY THE CONTENTS OF TEMP3
 027764  106737  025414          4$:     MFPS    @#PSWORD        ;SAVE PS
 027770  123737  025430  025414          CMPB    @#TEMP6,@#PSWORD;COMPARE PS WITH THE CONTENTS OF TEMP6
 027776  001401                          BEQ     11$
 030000  104000                          EMT                     ;WRONG PS
 030002  005237  025412          11$:    INC     @#COUNT
 030006  023700  025424                  CMP     @#TEMP4,%0      ;IS THE RESULT IN R0 SAME AS TEMP4?
 030012  001401                          BEQ     12$
 030014  104000                          EMT                     ;WRONG RESULT IN R0
 030016  023701  025426          12$:    CMP     @#TEMP5,%1      ;IS THE RESULT IN R1 SAME AS TEMP5?
                                                                 ;TEMP1 TEMP2 SHIFTED BY TEMP3=TEMP4 TEMP5
                                                                 ;AND PS=TEMP6
 030022  001401                          BEQ     13$
 030024  104000                          EMT                     ;WRONG RESULT IN R1
 030026  010205                  13$:    MOV     R2,R5           ;RESTORE R5
 030030  021537  025412                  CMP     (R5),@#COUNT    ;IS TEST NUMBER=COUNTER?
 030034  001401                          BEQ     14$
 030036  104000                          EMT                     ;NO
 030040  005215                  14$:    INC     (R5)
 030042  021527  000160                  CMP     (R5),#160       ;HAVE THE FIRST 159 TEST BEEN EXECUTED?
 030046  002014                          BGE     6$              ;YES
 030050  005237  025422                  INC     @#TEMP3
 030054  000241                          CLC
 030056  006137  025426                  ROL     @#TEMP5         ;ROTATE TEMP5 LEFT BY 1 PLACE
 030062  006137  025424                  ROL     @#TEMP4         ;INTRODUCE CARRY FROM TEMP4 IN TEMP5
 030066  021527  000121                  CMP     (R5),#121       ;IS IT TEST 121?
 030072  001004                          BNE     REGR23
```

```
 7491  030074  004467  000344            JSR     R4,RITSH        ;IF SO THEN GO AND INITIATE RIGHT SHIFT
 7492  030100  004767  000374     6$:    JSR     %7,TST160
 7493  030104  013702  025416     REGR23: MOV    @#TEMP1,%2      ;PLACE THE CONTENTS OF TEMP1 IN REGISTER 2
 7494  030110  013703  025420            MOV     @#TEMP2,%2!1    ;PLACE THE CONTENTS OF TEMP2 IN REGISTER 3
 7495  030114  000241                    CLC
 7496  030116  032737  000001  001006    BIT     #1,@#$PASS      ;IS IT AN EVEN PASS ?
 7497  030124  001004                    BNE     2$              ;IF NOT THEN GO TO 2$
 7498  030126  013704  025422            MOV     @#TEMP3,R4      ;OTHERWISE EXECUTE ASHC INSTRUCTION IN MODE 0
 7499  030132  073204                    ASHC    R4,R2           ;USING R2
 7500  030134  000402                    BR      4$
 7501  030136  073267  175260     2$:    ASHC    TEMP3,%2        ;ASHC REGISTER 2 BY THE CONTETNS OF TEMP3
 7502  030142  106737  025414     4$:    MFPS    @#PSWORD        ;SAVE PS
 7503  030146  123737  025430  025414    CMPB    @#TEMP6,@#PSWORD;COMPARE PS WITH THE CONTENTS OF TEMP6
 7504  030154  001401                    BEQ     11$
 7505  030156  104000                    EMT                     ;WRONG PS
 7506  030160  005237  025412     11$:   INC     @#COUNT
 7507  030164  023702  025424            CMP     @#TEMP4,%2      ;IS THE RESULT IN R2 SAME AS TEMP4?
 7508  030170  001401                    BEQ     12$
 7509  030172  104000                    EMT                     ;WRONG RESULT IN R2
 7510  030174  023703  025426     12$:   CMP     @#TEMP5,%3      ;IS THE RESULT IN R3 SAME AS TEMP5?
 7511                                                            ;TEMP1 TEMP2 SHIFTED BY TEMP3=TEMP4 TEMP5
 7512                                                            ;AND PS=TEMP6
 7513  030200  001401                    BEQ     13$
 7514  030202  104000                    EMT                     ;WRONG RESULT IN R1
 7515  030204  021537  025412     13$:   CMP     (R5),@#COUNT    ;IS TEST NUMBER=COUNTER?
 7516  030210  001401                    BEQ     14$
 7517  030212  104000                    EMT                     ;NO
 7518  030214  005215     14$:   INC     (R5)
 7519  030216  021527  000160            CMP     (R5),#160       ;HAVE THE FIRST 159 TEST BEEN EXECUTED?
 7520  030222  002014                    BGE     6$              ;YES
 7521  030224  005237  025422            INC     @#TEMP3
 7522  030230  000241                    CLC
 7523  030232  006137  025426            ROL     @#TEMP5         ;ROTATE TEMP5 LEFT BY 1 PLACE
 7524  030236  006137  025424            ROL     @#TEMP4         ;INTRODUCE CARRY FROM TEMP5 IN TEMP4
 7525  030242  021527  000121            CMP     (R5),#121       ;IS IT TEST 121?
 7526  030246  001004                    BNE     REG45
 7527  030250  004467  000170            JSR     R4,RITSH        ;IF SO THEN GO AND INITIATE RIGHT SHIFT
 7528  030254  004767  000220     6$:    JSR     %7,TST160
 7529  030260  010501     REG45:  MOV     R5,R1           ;SAVE R5
 7530  030262  013704  025416            MOV     @#TEMP1,%4      ;PLACE THE CONTENTS OF TEMP1 IN REGISTER 4
 7531  030266  013705  025420            MOV     @#TEMP2,%4!1    ;PLACE THE CONTENTS OF TEMP2 IN REGISTER 5
 7532  030272  000241                    CLC
 7533  030274  032737  000001  001006    BIT     #1,@#$PASS      ;IS IT AN EVEN PASS ?
 7534  030302  001004                    BNE     2$              ;IF NOT THEN GO TO 2$
 7535  030304  013700  025422            MOV     @#TEMP3,R0      ;OTHERWISE EXECUTE ASHC INSTRUCTION IN MODE 0
 7536  030310  073400                    ASHC    R0,R4           ;USING R4
 7537  030312  000402                    BR      4$
 7538  030314  073467  175102     2$:    ASHC    TEMP3,%4        ;ASHC REGISTER 4 BY THE CONTENTS OF TEMP3
 7539  030320  106737  025414     4$:    MFPS    @#PSWORD        ;SAVE PS
 7540  030324  123737  025430  025414    CMPB    @#TEMP6,@#PSWORD;COMPARE PS WITH THE CONTENTS OF TEMP6
 7541  030332  001401                    BEQ     11$
 7542  030334  104000                    EMT                     ;WRONG PS
 7543  030336  005237  025412     11$:   INC     @#COUNT
 7544  030342  023704  025424            CMP     @#TEMP4,%4      ;IS THE RESULT IN R4 SAME AS TEMP4?
 7545  030346  001401                    BEQ     12$
 7546  030350  104000                    EMT                     ;WRONG RESULT IN R4
```

```
7547  030352  023705  025426          12$:    CMP     @#TEMP5,%5      ;IS THE RESULT IN R5 SAME AS TEMP5?
7548                                                                    ;TEMP1 TEMP2 SHIFTED BY TEMP3=TEMP4 TEMP5
7549                                                                    ;AND PS=TEMP6
7550  030356  001401                          BEQ     13$
7551  030360  104000                          EMT                     ;WRONG RESULT IN R5
7552  030362  021137  025412          13$:    CMP     (R1),@#COUNT    ;IS TEST NUMBER=COUNTER?
7553  030366  001401                          BEQ     14$
7554  030370  104000                          EMT                     ;NO
7555  030372  010105          14$:    MOV     R1,R5                   ;RESTORE R5
7556  030374  005215                          INC     (R5)
7557  030376  021527  000160                  CMP     (R5),#160       ;HAVE THE FIRST 159 TEST BEEN EXECUTED?
7558  030402  002014                          BGE     6$              ;YES
7559  030404  005237  025422                  INC     @#TEMP3
7560  030410  000241                          CLC
7561  030412  006137  025426                  ROL     @#TEMP5         ;ROTATE TEMP5 LEFT BY 1 PLACE
7562  030416  006137  025424                  ROL     @#TEMP4         ;INTRODUCE CARRY FROM TEMP5 IN TEMP4
7563  030422  021527  000121                  CMP     (R5),#121       ;IS IT TEST 121?
7564  030426  001004                          BNE     8$
7565  030430  004467  000010                  JSR     R4,RITSH        ;IF SO THEN GO AND INITIATE RIGHT SHIFT
7566  030434  004767  000040          6$:     JSR     %7,TST160
7567  030440  000167  177260          8$:     JMP     REG01
7568  030444  022424                  RITSH:  CMP     (R4)+,(R4)+     ;MAKE R4 POINT TO THE NEXT REG TAG
7569  030446  012737  040000  025416          MOV     #40000,@#TEMP1  ;TEMP1=4000
7570  030454  005037  025420                  CLR     @#TEMP2         ;TEMP2=0
7571  030460  012737  177742  025422          MOV     #-30.,@#TEMP3   ;TEMP3=-30
7572  030466  005037  025424                  CLR     @#TEMP4         ;TEMP4=0
7573  030472  005237  025426                  INC     @#TEMP5         ;TEMP5=1
7574  030476  000204                          RTS     R4
7575  030500  021527  000160          TST160: CMP     (R5),#160       ;IS IT TEST 160
7576  030504  001010                          BNE     TST161          ;IF NOT THEN TRY TEST 161
7577  030506  005037  025416                  CLR     @#TEMP1         ;0 0 SHIFTED BY 0
7578  030512  005037  025424                  CLR     @#TEMP4         ;IS EQUAL TO 0 0
7579  030516  012737  000004  025430          MOV     #4,@#TEMP6      ;AND PS=4
7580  030524  000207                          RTS     %7
7581  030526  021527  000161          TST161: CMP     (R5),#161       ;IS IT TEST 161
7582  030532  001004                          BNE     TST162
7583  030534  012737  177746  025422          MOV     #-32,@#TEMP3    ;0 0 SHIFTED BY -32=0 0, PS=4
7584  030542  000207                          RTS     %7
7585  030544  021527  000162          TST162: CMP     (R5),#162       ;IS IT TEST 162
7586  030550  001004                          BNE     TST163          ;IF NOT THEN TRY TEST 163
7587  030552  012737  000032  025422          MOV     #32,@#TEMP3     ;0 0 SHIFTED BY 32=0 0, PS=4
7588  030560  000207                          PTS     %7
7589  030562  021527  000163          TST163: CMP     (R5),#163       ;IS IT TEST 163?
7590  030566  001016                          BNE     TST164          ;IF NOT THEN TRY TEST 164
7591  030570  012737  052525  025416          MOV     #52525,@#TEMP1  ;52525 0
7592  030576  012737  177760  025422          MOV     #-16.,@#TEMP3   ;SHIFTED BY -16.
7593  030604  005037  025424                  CLR     @#TEMP4
7594  030610  012737  052525  025426          MOV     #52525,@#TEMP5  ;IS EQUAL TO 0 52525
7595  030616  005037  025430                  CLR     @#TEMP6         ;AND PS = 0
7596  030622  000207                          RTS     %7
7597  030624  021527  000164          TST164: CMP     (R5),#164       ;IS IT TEST 164?
7598  030630  001014                          BNE     TST165          ;IF NOT THEN TRY TEST 165
7599  030632  012737  125252  025416          MOV     #125252,@#TEMP1 ;125252 0 SHIFTED BY -16.
7600  030640  005337  025424                  DEC     @#TEMP4
7601  030644  012737  125252  025426          MOV     #125252,@#TEMP5 ;IS EQUAL TO -1 125252
7602  030652  012737  000010  025430          MOV     #10,@#TEMP6     ;AND PS=10
```

```
 7603  030660  000207                          RTS     %7
 7604  030662  021527  000165          TST165: CMP     (R5),#165       ;IS IT TEST 165?
 7605  030666  001007                          BNE     TST166          ;IF NOT THEN TRY TEST 166
 7606  030670  012737  177777  025416          MOV     #-1,@#TEMP1     ;-1 0 SHIFTED BY -16
 7607  030676  012737  177777  025426          MOV     #-1,@#TEMP5     ;IS EQUAL TO -1 -1, AND PS=10
 7608  030704  000207                          RTS     %7
 7609  030706  021527  000166          TST166: CMP     (R5),#166       ;IS IT TEST 166?
 7610  030712  001011                          BNE     TST167          ;IF NOT THEN TRY TEST 167
 7611  030714  012737  100000  025416          MOV     #100000,@#TEMP1 ;100000 0
 7612  030722  012737  177740  025422          MOV     #-32.,@#TEMP3   ;SHIFTED BY -32 IS EQUAL TO -1 -1
 7613  030730  005237  025430                  INC     @#TEMP6         ;AND PS=11
 7614  030734  000207                          RTS     %7
 7615  030736  021527  000167          TST167: CMP     (R5),#167       ;IS IT TEST 167?
 7616  030742  001014                          BNE     TST170          ;IF NOT THEN TRY TEST 170
```

```
                                                                D 12
  7617  030744  005037  025416                CLR     @#TEMP1
  7618  030750  005337  025420                DEC     @#TEMP2         ;0 -1
```

```
 7619  030754  012737  000020  025422          MOV     #16.,@#TEMP3    ;SHIFTED BY 16.
 7620  030762  005037  025426                  CLR     @#TEMP5         ;IS EQUAL TO -1 0
 7621  030766  005237  025430                  INC     @#TEMP6         ;AND PS=12
 7622  030772  000207                          RTS     %7
 7623  030774  021527  000170          TST170: CMP     (R5),#170       ;IS IT TEST 170?
```

```
  7624  031000  001007                BNE     TST171          ;IF NOT THEN TRY TEST 171
```

```
7625  031002  012737  125252  025420          MOV     #125252,@#TEMP2 ;0 125252 SHIFTED BY 16
7626  031010  012737  125252  025424          MOV     #125252,@#TEMP4 ;IS EQUAL TO 125252 0, AND PS=12
7627  031016  000207                          RTS     %7
7628  031020  021527  000171          TST171: CMP     (R5),#171       ;IS IT TEST 171?
7629  031024  001010                          BNE     TST172          ;IF NOT THEN TRY TEST 172
7630  031026  005337  025422                  DEC     @#TEMP3         ;0 125252 SHIFTED BY 15
7631  031032  012737  052525  025424          MOV     #52525,@#TEMP4  ;IS EQUAL TO 52525 0
7632  031040  005037  025430                  CLR     @#TEMP6         ;AND PS=0
7633  031044  000207                          RTS     %7
7634  031046  021527  000172          TST172: CMP     (R5),#172       ;IS IT TEST 172?
7635  031052  001006                          BNE     TST173          ;IF NOT THEN TRY TEST 173
7636  031054  012737  052525  025420          MOV     #52525,@#TEMP2  ;0 52525
7637  031062  005237  025422                  INC     @#TEMP3         ;SHIFTED BY 16. IS EQUAL TO 52525 0, AND PS=0
7638  031066  000207                          RTS     %7
7639  031070  021527  000173          TST173: CMP     (R5),#173       ;IS IT TEST 173?
7640  031074  001014                          BNE     TST174          ;IF NOT THEN TRY TEST 174
7641  031076  012737  177777  025420          MOV     #-1,@#TEMP2     ;0 -1
7642  031104  005337  025422                  DEC     @#TEMP3         ;SHIFTED BY 15.
7643  031110  012737  077777  025424          MOV     #77777,@#TEMP4
7644  031116  012737  100000  025426          MOV     #100000,@#TEMP5 ;IS EQUAL TO 77777 100000, AND PS=0
7645  031124  000207                          RTS     %7
7646  031126  021527  000174          TST174: CMP     (R5),#174       ;IS IT TEST 174?
7647  031132  001013                          BNE     TST175          ;IF NOT THEN TRY TEST 175
7648  031134  012737  100000  025416          MOV     #100000,@#TEMP1
7649  031142  005337  025420                  DEC     @#TEMP2         ;100000 -2 SHIFTED BY 15.
7650  031146  005037  025426                  CLR     @#TEMP5         ;IS EQUAL TO 77777 0
7651  031152  012737  000002  025430          MOV     #2,@#TEMP6      ;AND PS=2
7652  031160  000207                          RTS     %7
7653  031162  021527  000175          TST175: CMP     (R5),#175       ;IS IT TEST 175?
7654  031166  001015                          BNE     ENT176          ;IF NOT THEN TRY TEST 176
7655  031170  012737  177777  025416          MOV     #-1,@#TEMP1
7656  031176  005037  025420                  CLR     @#TEMP2         ;-1 0
7657  031202  005237  025422                  INC     @#TEMP3         ;SHIFTED BY 16.
7658  031206  005037  025424                  CLR     @#TEMP4         ;IS EQUAL TO 0 0
7659  031212  012737  000007  025430          MOV     #7,@#TEMP6      ;AND PS=7
```

```
 7660  031220  000207                          RTS     %7
 7661  031222  021527  000176          ENT176: CMP     (R5),#176       ;IS THE PROGRM ENTERING TEST 176?
 7662  031226  001401                          BEQ     1$
 7663  031230  104000                          EMT                     ;TEST NUMBER GOOFED
 7664
 7665  031232  005726                  1$:     TST     (SP)+           ;RESTORE STACK POINTER
 7666
 7667                                  ;*****************************************************************
 7668                                  ;TEST:176       1 SHIFTED BY 8. = 400  PS = 0
 7669                                  ;*****************************************************************
 7670
 7671  031234                          TST176:
 7672  031234  012701  000000                  MOV     #DUMMY,%1       ;LOAD R1 WITH DUMMY
 7673  031240  012701  000001                  MOV     #1,%1!1         ;LOAD R1!1 WITH 1
 7674  031244  000241                          CLC
 7675  031246  073127  000010                  ASHC    #8.,%1          ;SHIFT R1,R1!1 BY 8.
 7676  031252  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 7677  031256  122737  000000  025414          CMPB    #0,@#PSWORD     ;IS THE PS 0?
 7678  031264  001401                          BEQ     11$
 7679  031266  104000                          EMT                     ;THE PS IS NOT EQUAL TO 0
 7680  031270  022701  000400          11$:    CMP     #400,%1         ;IS THE RESULT 400?
 7681  031274  001401                          BEQ     13$
 7682  031276  104000                          EMT                     ;R1 IS NOT EQUAL TO 400
 7683  031300                          13$:
 7684  031300  005215                          INC     (R5)
 7685
 7686
 7687                                  ;*****************************************************************
 7688                                  ;TEST:177       -1 SHIFTED BY 15. = 100000  PS = 11
 7689                                  ;*****************************************************************
 7690
 7691  031302                          TST177:
 7692  031302  012703  000000                  MOV     #DUMMY,%3       ;LOAD R3 WITH DUMMY
 7693  031306  012703  177777                  MOV     #-1,%3!1        ;LOAD R3!1 WITH -1
 7694  031312  000241                          CLC
 7695  031314  073327  000017                  ASHC    #15.,%3         ;SHIFT R3,R3!1 BY 15.
 7696  031320  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 7697  031324  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS THE PS 11?
 7698  031332  001401                          BEQ     11$
 7699  031334  104000                          EMT                     ;THE PS IS NOT EQUAL TO 11
 7700  031336  022703  100000          11$:    CMP     #100000,%3      ;IS THE RESULT 100000?
 7701  031342  001401                          BEQ     13$
 7702  031344  104000                          EMT                     ;R3 IS NOT EQUAL TO 100000
 7703  031346                          13$:
 7704  031346  005215                          INC     (R5)
 7705
 7706
 7707                                  ;*****************************************************************
 7708                                  ;TEST:200       52525 SHIFTED BY 0 = 52525  PS = 0
 7709                                  ;*****************************************************************
 7710
 7711  031350                          TST200:
 7712  031350  010501                          MOV     R5,R1           ;SAVE R5
 7713  031352  012705  000000                  MOV     #DUMMY,%5       ;LOAD R5 WITH DUMMY
 7714  031356  012705  052525                  MOV     #52525,%5!1     ;LOAD R5!1 WITH 52525
 7715  031362  000241                          CLC
```

```
7716  031364  073527  000000          ASHC    #0,%5           ;SHIFT R5,R5!1 BY 0
7717  031370  106737  025414          MFPS    @#PSWORD        ;SAVE PS
7718  031374  122737  000000  025414  CMPB    #0,@#PSWORD     ;IS THE PS 0?
7719  031402  001401                  BEQ     11$
7720  031404  104000                  EMT                     ;THE PS IS NOT EQUAL TO 0
7721  031406  022705  052525  11$:    CMP     #52525,%5       ;IS THE RESULT 52525?
7722  031412  001401                  BEQ     13$
7723  031414  104000                  EMT                     ;R5 IS NOT EQUAL TO 52525
7724  031416                  13$:
7725  031416  010105                  MOV     R1,R5           ;RESTORE R5
7726  031420  005215                  INC     (R5)
7727
7728
7729                          ;*****************************************************************************
7730                          ;TEST:201       20010 SHIFTED BY -13. = 101  PS = 0
7731                          ;*****************************************************************************
7732
7733  031422                  TST201:
7734  031422  012701  000000          MOV     #DUMMY,%1       ;LOAD R1 WITH DUMMY
7735  031426  012701  020010          MOV     #20010,%1!1     ;LOAD R1!1 WITH 20010
7736  031432  000241                  CLC
7737  031434  073127  177763          ASHC    #-13.,%1        ;SHIFT R1,R1!1 BY -13.
7738  031440  106737  025414          MFPS    @#PSWORD        ;SAVE PS
7739  031444  122737  000000  025414  CMPB    #0,@#PSWORD     ;IS THE PS 0?
7740  031452  001401                  BEQ     11$
7741  031454  104000                  EMT                     ;THE PS IS NOT EQUAL TO 0
7742  031456  022701  000101  11$:    CMP     #101,%1         ;IS THE RESULT 101?
7743  031462  001401                  BEQ     13$
7744  031464  104000                  EMT                     ;R1 IS NOT EQUAL TO 101
7745  031466                  13$:
7746  031466  005215                  INC     (R5)
7747
7748
7749                          ;*****************************************************************************
7750                          ;TEST:202       -1 SHIFTED BY 16. = 0  PS = 11
7751                          ;*****************************************************************************
7752
7753  031470                  TST202:
7754  031470  012703  000000          MOV     #DUMMY,%3       ;LOAD R3 WITH DUMMY
7755  031474  012703  177777          MOV     #-1,%3!1        ;LOAD R3!1 WITH -1
7756  031500  000241                  CLC
7757  031502  073327  000020          ASHC    #16.,%3         ;SHIFT R3,R3!1 BY 16.
7758  031506  106737  025414          MFPS    @#PSWORD        ;SAVE PS
7759  031512  122737  000011  025414  CMPB    #11,@#PSWORD    ;IS THE PS 11?
7760  031520  001401                  BEQ     11$
7761  031522  104000                  EMT                     ;THE PS IS NOT EQUAL TO 11
7762  031524  022703  000000  11$:    CMP     #0,%3           ;IS THE RESULT 0?
7763  031530  001401                  BEQ     13$
7764  031532  104000                  EMT                     ;R3 IS NOT EQUAL TO 0
7765  031534                  13$:
7766  031534  005215                  INC     (R5)
7767
7768
7769                          ;*****************************************************************************
7770                          ;TEST:203       1 SHIFTED BY -1 = 100000  PS = 1
7771                          ;*****************************************************************************
```

```
 7772
 7773  031536                          TST203:
 7774  031536  010501                          MOV     R5,R1           ;SAVE R5
 7775  031540  012705  000000                  MOV     #DUMMY,%5       ;LOAD R5 WITH DUMMY
 7776  031544  012705  000001                  MOV     #1,%5!1         ;LOAD R5!1 WITH 1
 7777  031550  000241                          CLC
 7778  031552  073527  177777                  ASHC    #-1,%5          ;SHIFT R5,R5!1 BY -1
 7779  031556  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 7780  031562  122737  000001  025414          CMPB    #1,@#PSWORD     ;IS THE PS 1?
 7781  031570  001401                          BEQ     11$
 7782  031572  104000                          EMT                     ;THE PS IS NOT EQUAL TO 1
 7783  031574  022705  100000          11$:    CMP     #100000,%5      ;IS THE RESULT 100000?
 7784  031600  001401                          BEQ     13$
 7785  031602  104000                          EMT                     ;R5 IS NOT EQUAL TO 100000
 7786  031604                          13$:
 7787  031604  010105                          MOV     R1,R5           ;RESTORE R5
 7788  031606  005215                          INC     (R5)
 7789
 7790
 7791                                  ;*****************************************************************************
 7792                                  ;TEST:204       125252 SHIFTED BY -16. = 125252  PS = 11
 7793                                  ;*****************************************************************************
 7794
 7795  031610                          TST204:
 7796  031610  012701  000000                  MOV     #DUMMY,%1       ;LOAD R1 WITH DUMMY
 7797  031614  012701  125252                  MOV     #125252,%1!1    ;LOAD R1!1 WITH 125252
 7798  031620  000241                          CLC
 7799  031622  073127  177760                  ASHC    #-16.,%1        ;SHIFT R1,R1!1 BY -16.
 7800  031626  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 7801  031632  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS THE PS 11?
 7802  031640  001401                          BEQ     11$
 7803  031642  104000                          EMT                     ;THE PS IS NOT EQUAL TO 11
 7804  031644  022701  125252          11$:    CMP     #125252,%1      ;IS THE RESULT 125252?
 7805  031650  001401                          BEQ     13$
 7806  031652  104000                          EMT                     ;R1 IS NOT EQUAL TO 125252
 7807  031654                          13$:
 7808  031654  005215                          INC     (R5)
 7809
 7810
 7811                                  ;*****************************************************************************
 7812                                  ;TEST:205       125252 125252 SHIFTED BY 21. = 52500 000000  PS = 3
 7813                                  ;*****************************************************************************
 7814
 7815  031656                          TST205:
 7816  031656  012702  125252                  MOV     #125252,%2      ;LOAD R2 WITH 125252
 7817  031662  012703  125252                  MOV     #125252,%2!1    ;LOAD R2!1 WITH 125252
 7818  031666  000241                          CLC
 7819  031670  073227  000025                  ASHC    #21.,%2         ;SHIFT R2,R2!1 BY 21.
 7820  031674  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 7821  031700  122737  000003  025414          CMPB    #3,@#PSWORD     ;IS THE PS 3?
 7822  031706  001401                          BEQ     11$
 7823  031710  104000                          EMT                     ;THE PS IS NOT EQUAL TO 3
 7824  031712  022702  052500          11$:    CMP     #52500,%2       ;IS THE RESULT 52500?
 7825  031716  001401                          BEQ     12$
 7826  031720  104000                          EMT                     ;R2 IS NOT EQUAL TO 52500
 7827  031722  022703  000000          12$:    CMP     #000000,%2!1    ;IS THE RESULT 000000?
```

```
 7828  031726  001401                          BEQ     13$
 7829  031730  104000                          EMT                     ;R2!1 IS NOT EQUAL TO 000000
 7830  031732                          13$:
 7831  031732  005215                          INC     (R5)
 7832
 7833
 7834
 7835  031734  012702  177771                  MOV     #-7,%2
 7836  031740  012703  025432                  MOV     #S1,%3
 7837  031744  012704  025434                  MOV     #S2,%4
 7838
 7839                                  ;*****************************************************************************
 7840                                  ;TEST:206       125252 125252 SHIFTED BY S1 = 177525 52525  PS = 10
 7841                                  ;*****************************************************************************
 7842
 7843  031750                          TST206:
 7844  031750  012700  125252                  MOV     #125252,%0              ;LOAD R0 WITH 125252
 7845  031754  012701  125252                  MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
 7846  031760  000241                          CLC
 7847  031762  073067  173444                  ASHC    S1,%0           ;SHIFT R0,R0!1 BY S1
 7848  031766  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 7849  031772  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS THE PS 10?
 7850  032000  001401                          BEQ     11$
 7851  032002  104000                          EMT                     ;THE PS IS NOT EQUAL TO 10
 7852  032004  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
 7853  032010  001401                          BEQ     12$
 7854  032012  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525
 7855  032014  022701  052525          12$:    CMP     #52525,%0!1     ;IS THE RESULT 52525?
 7856  032020  001401                          BEQ     13$
 7857  032022  104000                          EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
 7858  032024                          13$:
 7859  032024  005215                          INC     (R5)
 7860
 7861
 7862                                  ;*****************************************************************************
 7863                                  ;TEST:207       125252 125252 SHIFTED BY @S2 = 177525 52525  PS = 10
 7864                                  ;*****************************************************************************
 7865
 7866  032026                          TST207:
 7867  032026  012700  125252                  MOV     #125252,%0              ;LOAD R0 WITH 125252
 7868  032032  012701  125252                  MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
 7869  032036  000241                          CLC
 7870  032040  073077  173370                  ASHC    @S2,%0          ;SHIFT R0,R0!1 BY @S2
 7871  032044  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 7872  032050  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS THE PS 10?
 7873  032056  001401                          BEQ     11$
 7874  032060  104000                          EMT                     ;THE PS IS NOT EQUAL TO 10
 7875  032062  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
 7876  032066  001401                          BEQ     12$
 7877  032070  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525
 7878  032072  022701  052525          12$:    CMP     #52525,%0!1     ;IS THE RESULT 52525?
 7879  032076  001401                          BEQ     13$
 7880  032100  104000                          EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
 7881  032102                          13$:
 7882  032102  005215                          INC     (R5)
 7883
```

```
                                ;*****************************************************************
                                ;TEST:210       125252 125252 SHIFTED BY @#S1 = 177525 52525  PS = 10
                                ;*****************************************************************

032104                          TST210:
032104  012700  125252                  MOV     #125252,%0              ;LOAD R0 WITH 125252
032110  012701  125252                  MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
032114  000241                          CLC
032116  073037  025432                  ASHC    @#S1,%0         ;SHIFT R0,R0!1 BY @#S1
032122  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
032126  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS THE PS 10?
032134  001401                          BEQ     11$
032136  104000                          EMT                     ;THE PS IS NOT EQUAL TO 10
032140  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
032144  001401                          BEQ     12$
032146  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525
032150  022701  052525          12$:    CMP     #52525,%0!1     ;IS THE RESULT 52525?
032154  001401                          BEQ     13$
032156  104000                          EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
032160                          13$:
032160  005215                          INC     (R5)


                                ;*****************************************************************
                                ;TEST:211       125252 125252 SHIFTED BY (3) = 177525 52525  PS = 10
                                ;*****************************************************************

032162                          TST211:
032162  012700  125252                  MOV     #125252,%0              ;LOAD R0 WITH 125252
032166  012701  125252                  MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
032172  000241                          CLC
032174  073013                          ASHC    (3),%0          ;SHIFT R0,R0!1 BY (3)
032176  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
032202  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS THE PS 10?
032210  001401                          BEQ     11$
032212  104000                          EMT                     ;THE PS IS NOT EQUAL TO 10
032214  022700  177525          11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
032220  001401                          BEQ     12$
032222  104000                          EMT                     ;R0 IS NOT EQUAL TO 177525
032224  022701  052525          12$:    CMP     #52525,%0!1     ;IS THE RESULT 52525?
032230  001401                          BEQ     13$
032232  104000                          EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
032234                          13$:
032234  005215                          INC     (R5)


                                ;*****************************************************************
                                ;TEST:212       125252 125252 SHIFTED BY (3)+ = 177525 52525  PS = 10
                                ;*****************************************************************

032236                          TST212:
032236  012700  125252                  MOV     #125252,%0              ;LOAD R0 WITH 125252
032242  012701  125252                  MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
032246  000241                          CLC
032250  073023                          ASHC    (3)+,%0         ;SHIFT R0,R0!1 BY (3)+
```

```
7940  032252  106737  025414              MFPS    @#PSWORD        ;SAVE PS
7941  032256  122737  000010  025414      CMPB    #10,@#PSWORD    ;IS THE PS 10?
7942  032264  001401                      BEQ     11$
7943  032266  104000                      EMT                     ;THE PS IS NOT EQUAL TO 10
7944  032270  022700  177525      11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
7945  032274  001401                      BEQ     12$
7946  032276  104000                      EMT                     ;R0 IS NOT EQUAL TO 177525
7947  032300  022701  052525      12$:    CMP     #52525,%0!1     ;IS THE RESULT 52525?
7948  032304  001401                      BEQ     13$
7949  032306  104000                      EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
7950  032310                      13$:
7951  032310  005215                      INC     (R5)
7952
7953
7954                                ;*****************************************************************************
7955                                ;TEST:213       125252 125252 SHIFTED BY -(3) = 177525 52525  PS = 10
7956                                ;*****************************************************************************
7957
7958  032312                      TST213:
7959  032312  012700  125252              MOV     #125252,%0              ;LOAD R0 WITH 125252
7960  032316  012701  125252              MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
7961  032322  000241                      CLC
7962  032324  073043                      ASHC    -(3),%0         ;SHIFT R0,R0!1 BY -(3)
7963  032326  106737  025414              MFPS    @#PSWORD        ;SAVE PS
7964  032332  122737  000010  025414      CMPB    #10,@#PSWORD    ;IS THE PS 10?
7965  032340  001401                      BEQ     11$
7966  032342  104000                      EMT                     ;THE PS IS NOT EQUAL TO 10
7967  032344  022700  177525      11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
7968  032350  001401                      BEQ     12$
7969  032352  104000                      EMT                     ;R0 IS NOT EQUAL TO 177525
7970  032354  022701  052525      12$:    CMP     #52525,%0!1     ;IS THE RESULT 52525?
7971  032360  001401                      BEQ     13$
7972  032362  104000                      EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
7973  032364                      13$:
7974  032364  005215                      INC     (R5)
7975
7976
7977                                ;*****************************************************************************
7978                                ;TEST:214       125252 125252 SHIFTED BY 2(4) = 177252 125252  PS = 11
7979                                ;*****************************************************************************
7980
7981  032366                      TST214:
7982  032366  012700  125252              MOV     #125252,%0              ;LOAD R0 WITH 125252
7983  032372  012701  125252              MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
7984  032376  000241                      CLC
7985  032400  073064  000002              ASHC    2(4),%0         ;SHIFT R0,R0!1 BY 2(4)
7986  032404  106737  025414              MFPS    @#PSWORD        ;SAVE PS
7987  032410  122737  000011  025414      CMPB    #11,@#PSWORD    ;IS THE PS 11?
7988  032416  001401                      BEQ     11$
7989  032420  104000                      EMT                     ;THE PS IS NOT EQUAL TO 11
7990  032422  022700  177252      11$:    CMP     #177252,%0      ;IS THE RESULT 177252?
7991  032426  001401                      BEQ     12$
7992  032430  104000                      EMT                     ;R0 IS NOT EQUAL TO 177252
7993  032432  022701  125252      12$:    CMP     #125252,%0!1    ;IS THE RESULT 125252?
7994  032436  001401                      BEQ     13$
7995  032440  104000                      EMT                     ;R0!1 IS NOT EQUAL TO 125252 OR INCORRECT SEQUENCE
```

```
 7996  032442
 7997  032442  005215                    13$:    INC     (R5)
 7998
 7999
 8000                                    ;*****************************************************************************
 8001                                    ;TEST:215       125252 125252 SHIFTED BY @(4) = 177525 52525  PS = 10
 8002                                    ;*****************************************************************************
 8003
 8004  032444                            TST215:
 8005  032444  012700  125252                    MOV     #125252,%0              ;LOAD R0 WITH 125252
 8006  032450  012701  125252                    MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
 8007  032454  000241                            CLC
 8008  032456  073074  000000                    ASHC    @(4),%0         ;SHIFT R0,R0!1 BY @(4)
 8009  032462  106737  025414                    MFPS    @#PSWORD        ;SAVE PS
 8010  032466  122737  000010  025414           CMPB    #10,@#PSWORD    ;IS THE PS 10?
 8011  032474  001401                            BEQ     11$
 8012  032476  104000                            EMT                     ;THE PS IS NOT EQUAL TO 10
 8013  032500  022700  177525          11$:      CMP     #177525,%0      ;IS THE RESULT 177525?
 8014  032504  001401                            BEQ     12$
 8015  032506  104000                            EMT                     ;R0 IS NOT EQUAL TO 177525
 8016  032510  022701  052525          12$:      CMP     #52525,%0!1     ;IS THE RESULT 52525?
 8017  032514  001401                            BEQ     13$
 8018  032516  104000                            EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
 8019  032520                            13$:
 8020  032520  005215                            INC     (R5)
 8021
 8022
 8023                                    ;*****************************************************************************
 8024                                    ;TEST:216       125252 125252 SHIFTED BY @(4)+ = 177525 52525  PS = 10
 8025                                    ;*****************************************************************************
 8026
 8027  032522                            TST216:
 8028  032522  012700  125252                    MOV     #125252,%0              ;LOAD R0 WITH 125252
 8029  032526  012701  125252                    MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
 8030  032532  000241                            CLC
 8031  032534  073034                            ASHC    @(4)+,%0                ;SHIFT R0,R0!1 BY @(4)+
 8032  032536  106737  025414                    MFPS    @#PSWORD        ;SAVE PS
 8033  032542  122737  000010  025414           CMPB    #10,@#PSWORD    ;IS THE PS 10?
 8034  032550  001401                            BEQ     11$
 8035  032552  104000                            EMT                     ;THE PS IS NOT EQUAL TO 10
 8036  032554  022700  177525          11$:      CMP     #177525,%0      ;IS THE RESULT 177525?
 8037  032560  001401                            BEQ     12$
 8038  032562  104000                            EMT                     ;R0 IS NOT EQUAL TO 177525
 8039  032564  022701  052525          12$:      CMP     #52525,%0!1     ;IS THE RESULT 52525?
 8040  032570  001401                            BEQ     13$
 8041  032572  104000                            EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
 8042  032574                            13$:
 8043  032574  005215                            INC     (R5)
 8044
 8045
 8046                                    ;*****************************************************************************
 8047                                    ;TEST:217       125252 125252 SHIFTED BY @-(4) = 177525 52525  PS = 10
 8048                                    ;*****************************************************************************
 8049
 8050  032576                            TST217:
 8051  032576  012700  125252                    MOV     #125252,%0              ;LOAD R0 WITH 125252
```

```
 8052  032602  012701  125252            MOV     #125252,%0!1    ;LOAD R0!1 WITH 125252
 8053  032606  000241                    CLC
 8054  032610  073054                    ASHC    @-(4),%0                ;SHIFT R0,R0!1 BY @-(4)
 8055  032612  106737  025414            MFPS    @#PSWORD        ;SAVE PS
 8056  032616  122737  000010  025414    CMPB    #10,@#PSWORD    ;IS THE PS 10?
 8057  032624  001401                    BEQ     11$
 8058  032626  104000                    EMT                     ;THE PS IS NOT EQUAL TO 10
 8059  032630  022700  177525    11$:    CMP     #177525,%0      ;IS THE RESULT 177525?
 8060  032634  001401                    BEQ     12$
 8061  032636  104000                    EMT                     ;R0 IS NOT EQUAL TO 177525
 8062  032640  022701  052525    12$:    CMP     #52525,%0!1     ;IS THE RESULT 52525?
 8063  032644  001401                    BEQ     13$
 8064  032646  104000                    EMT                     ;R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
 8065  032650                    13$:
 8066  032650  005215                    INC     (R5)
 8067
 8068
 8069
 8070
 8071
 8072
 8073
 8074
 8075
```

```
                                        ;*********************************
                                        ;     MUL INSTRUCTION TESTS
                                        ;*********************************



                                        ;*************************************************************************
                                        ;TEST:220       MUL      1 * #0 = 0 0        PS = 4
                                        ;*************************************************************************

032652                                  TST220:
032652  012700  000001                          MOV     #1,%0           ;LOAD MULTIPLICAND WITH 1
032656  070027  000000                          MUL     #0,%0           ;MULTIPLY 1 * #0
032662  106737  025414                          MFPS    @#PSWORD        ;SAVE PS
032666  122737  000004  025414                  CMPB    #4,@#PSWORD     ;IS PS = 4
032674  001401                                  BEQ     11$
032676  104000                                  EMT                     ;PS IS WRONG
032700  022700  000000              11$:        CMP     #0,%0           ;IS HIGH ORDER = 0
032704  001401                                  BEQ     12$
032706  104000                                  EMT                     ;HIGH ORDER IS WRONG
032710  022701  000000              12$:        CMP     #0,%0!1         ;IS LOW ORDER = 0
032714  001401                                  BEQ     13$
032716  104000                                  EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
032720                                  13$:
032720  005215                                  INC     (R5)



                                        ;*************************************************************************
                                        ;TEST:221       MUL      -1 * #1 = -1 -1        PS = 10
                                        ;*************************************************************************

032722                                  TST221:
032722  012700  177777                          MOV     #-1,%0          ;LOAD MULTIPLICAND WITH -1
032726  070027  000001                          MUL     #1,%0           ;MULTIPLY -1 * #1
032732  106737  025414                          MFPS    @#PSWORD        ;SAVE PS
032736  122737  000010  025414                  CMPB    #10,@#PSWORD    ;IS PS = 10
032744  001401                                  BEQ     11$
032746  104000                                  EMT                     ;PS IS WRONG
032750  022700  177777              11$:        CMP     #-1,%0          ;IS HIGH ORDER = -1
032754  001401                                  BEQ     12$
032756  104000                                  EMT                     ;HIGH ORDER IS WRONG
032760  022701  177777              12$:        CMP     #-1,%0!1        ;IS LOW ORDER = -1
032764  001401                                  BEQ     13$
032766  104000                                  EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
032770                                  13$:
032770  005215                                  INC     (R5)



                                        ;*************************************************************************
                                        ;TEST:222       MUL      2 * #2 = 0 4        PS = 0
                                        ;*************************************************************************

032772                                  TST222:
032772  012702  000002                          MOV     #2,%2           ;LOAD MULTIPLICAND WITH 2
032776  070227  000002                          MUL     #2,%2           ;MULTIPLY 2 * #2
```

```
 8132  033002  106737  025414              MFPS    @#PSWORD        ;SAVE PS
 8133  033006  122737  000000  025414      CMPB    #0,@#PSWORD     ;IS PS = 0
 8134  033014  001401                      BEQ     11$
 8135  033016  104000                      EMT                     ;PS IS WRONG
 8136  033020  022702  000000          11$: CMP    #0,%2           ;IS HIGH ORDER = 0
 8137  033024  001401                      BEQ     12$
 8138  033026  104000                      EMT                     ;HIGH ORDER IS WRONG
 8139  033030  022703  000004          12$: CMP    #4,%2!1         ;IS LOW ORDER = 4
 8140  033034  001401                      BEQ     13$
 8141  033036  104000                      EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8142  033040                          13$:
 8143  033040  005215                      INC     (R5)
 8144
 8145
 8146                                  ;*************************************************************************
 8147                                  ;TEST:223       MUL     1000 * #200 = 1 0       PS = 1
 8148                                  ;*************************************************************************
 8149
 8150  033042                          TST223:
 8151  033042  010501                      MOV     R5,R1           ;SAVE R5
 8152  033044  012704  001000              MOV     #1000,%4        ;LOAD MULTIPLICAND WITH 1000
 8153  033050  070427  000200              MUL     #200,%4         ;MULTIPLY 1000 * #200
 8154  033054  106737  025414              MFPS    @#PSWORD        ;SAVE PS
 8155  033060  122737  000001  025414      CMPB    #1,@#PSWORD     ;IS PS = 1
 8156  033066  001401                      BEQ     11$
 8157  033070  104000                      EMT                     ;PS IS WRONG
 8158  033072  022704  000001          11$: CMP    #1,%4           ;IS HIGH ORDER = 1
 8159  033076  001401                      BEQ     12$
 8160  033100  104000                      EMT                     ;HIGH ORDER IS WRONG
 8161  033102  022705  000000          12$: CMP    #0,%4!1         ;IS LOW ORDER = 0
 8162  033106  001401                      BEQ     13$
 8163  033110  104000                      EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8164  033112                          13$:
 8165  033112  010105                      MOV     R1,R5           ;RESTORE R5
 8166  033114  005215                      INC     (R5)
 8167
 8168
 8169                                  ;*************************************************************************
 8170                                  ;TEST:224       MUL     2 * #77777 = 0 177776       PS = 1
 8171                                  ;*************************************************************************
 8172
 8173  033116                          TST224:
 8174  033116  012700  000002              MOV     #2,%0           ;LOAD MULTIPLICAND WITH 2
 8175  033122  070027  077777              MUL     #77777,%0       ;MULTIPLY 2 * #77777
 8176  033126  106737  025414              MFPS    @#PSWORD        ;SAVE PS
 8177  033132  122737  000001  025414      CMPB    #1,@#PSWORD     ;IS PS = 1
 8178  033140  001401                      BEQ     11$
 8179  033142  104000                      EMT                     ;PS IS WRONG
 8180  033144  022700  000000          11$: CMP    #0,%0           ;IS HIGH ORDER = 0
 8181  033150  001401                      BEQ     12$
 8182  033152  104000                      EMT                     ;HIGH ORDER IS WRONG
 8183  033154  022701  177776          12$: CMP    #177776,%0!1    ;IS LOW ORDER = 177776
 8184  033160  001401                      BEQ     13$
 8185  033162  104000                      EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8186  033164                          13$:
 8187  033164  005215                      INC     (R5)
```

```
                                ;*****************************************************************
                                ;TEST:225       MUL     7777 * #10 = 0 77770        PS = 0
                                ;*****************************************************************

033166                          TST225:
033166  012702  007777                  MOV     #7777,%2        ;LOAD MULTIPLICAND WITH 7777
033172  070227  000010                  MUL     #10,%2          ;MULTIPLY 7777 * #10
033176  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
033202  122737  000000  025414          CMPB    #0,@#PSWORD     ;IS PS = 0
033210  001401                          BEQ     11$
033212  104000                          EMT                     ;PS IS WRONG
033214  022702  000000          11$:    CMP     #0,%2           ;IS HIGH ORDER = 0
033220  001401                          BEQ     12$
033222  104000                          EMT                     ;HIGH ORDER IS WRONG
033224  022703  077770          12$:    CMP     #77770,%2!1     ;IS LOW ORDER = 77770
033230  001401                          BEQ     13$
033232  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
033234                          13$:
033234  005215                          INC     (R5)

                                ;*****************************************************************
                                ;TEST:226       MUL     77777 * #77777 = 37777 1        PS = 1
                                ;*****************************************************************

033236                          TST226:
033236  010501                          MOV     R5,R1           ;SAVE R5
033240  012704  077777                  MOV     #77777,%4       ;LOAD MULTIPLICAND WITH 77777
033244  070427  077777                  MUL     #77777,%4       ;MULTIPLY 77777 * #77777
033250  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
033254  122737  000001  025414          CMPB    #1,@#PSWORD     ;IS PS = 1
033262  001401                          BEQ     11$
033264  104000                          EMT                     ;PS IS WRONG
033266  022704  037777          11$:    CMP     #37777,%4       ;IS HIGH ORDER = 37777
033272  001401                          BEQ     12$
033274  104000                          EMT                     ;HIGH ORDER IS WRONG
033276  022705  000001          12$:    CMP     #1,%4!1         ;IS LOW ORDER = 1
033302  001401                          BEQ     13$
033304  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
033306                          13$:
033306  010105                          MOV     R1,R5           ;RESTORE R5
033310  005215                          INC     (R5)

                                ;*****************************************************************
                                ;TEST:227       MUL     -1 * #77777 = -1 100001         PS = 10
                                ;*****************************************************************

033312                          TST227:
033312  012702  177777                  MOV     #-1,%2          ;LOAD MULTIPLICAND WITH -1
033316  070227  077777                  MUL     #77777,%2       ;MULTIPLY -1 * #77777
033322  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
033326  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS PS = 10
033334  001401                          BEQ     11$
```

```
 8244  033336  104000                  EMT                     ;PS IS WRONG
 8245  033340  022702  177777  11$:    CMP     #-1,%2          ;IS HIGH ORDER = -1
 8246  033344  001401                  BEQ     12$
 8247  033346  104000                  EMT                     ;HIGH ORDER IS WRONG
 8248  033350  022703  100001  12$:    CMP     #100001,%2!1    ;IS LOW ORDER = 100001
 8249  033354  001401                  BEQ     13$
 8250  033356  104000                  EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8251  033360                  13$:
 8252  033360  005215                  INC     (R5)
 8253
 8254
 8255                          ;*************************************************************************
 8256                          ;TEST:230       MUL      -2 * #77777 = -1 2         PS = 11
 8257                          ;*************************************************************************
 8258
 8259  033362                  TST230:
 8260  033362  012700  177776          MOV     #-2,%0          ;LOAD MULTIPLICAND WITH -2
 8261  033366  070027  077777          MUL     #77777,%0       ;MULTIPLY -2 * #77777
 8262  033372  106737  025414          MFPS    @#PSWORD        ;SAVE PS
 8263  033376  122737  000011  025414  CMPB    #11,@#PSWORD    ;IS PS = 11
 8264  033404  001401                  BEQ     11$
 8265  033406  104000                  EMT                     ;PS IS WRONG
 8266  033410  022700  177777  11$:    CMP     #-1,%0          ;IS HIGH ORDER = -1
 8267  033414  001401                  BEQ     12$
 8268  033416  104000                  EMT                     ;HIGH ORDER IS WRONG
 8269  033420  022701  000002  12$:    CMP     #2,%0!1         ;IS LOW ORDER = 2
 8270  033424  001401                  BEQ     13$
 8271  033426  104000                  EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8272  033430                  13$:
 8273  033430  005215                  INC     (R5)
 8274
 8275
 8276                          ;*************************************************************************
 8277                          ;TEST:231       MUL      125252 * #2 = -1 52524         PS = 11
 8278                          ;*************************************************************************
 8279
 8280  033432                  TST231:
 8281  033432  012702  125252          MOV     #125252,%2      ;LOAD MULTIPLICAND WITH 125252
 8282  033436  070227  000002          MUL     #2,%2           ;MULTIPLY 125252 * #2
 8283  033442  106737  025414          MFPS    @#PSWORD        ;SAVE PS
 8284  033446  122737  000011  025414  CMPB    #11,@#PSWORD    ;IS PS = 11
 8285  033454  001401                  BEQ     11$
 8286  033456  104000                  EMT                     ;PS IS WRONG
 8287  033460  022702  177777  11$:    CMP     #-1,%2          ;IS HIGH ORDER = -1
 8288  033464  001401                  BEQ     12$
 8289  033466  104000                  EMT                     ;HIGH ORDER IS WRONG
 8290  033470  022703  052524  12$:    CMP     #52524,%2!1     ;IS LOW ORDER = 52524
 8291  033474  001401                  BEQ     13$
 8292  033476  104000                  EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8293  033500                  13$:
 8294  033500  005215                  INC     (R5)
 8295
 8296
 8297                          ;*************************************************************************
 8298                          ;TEST:232       MUL      125252 * #40000 = 165252 100000        PS = 11
 8299                          ;*************************************************************************
```

```
8300
8301   033502                          TST232:
8302   033502  010501                          MOV     R5,R1           ;SAVE R5
8303   033504  012704  125252                  MOV     #125252,%4      ;LOAD MULTIPLICAND WITH 125252
8304   033510  070427  040000                  MUL     #40000,%4       ;MULTIPLY 125252 * #40000
8305   033514  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
8306   033520  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS PS = 11
8307   033526  001401                          BEQ     11$
8308   033530  104000                          EMT                     ;PS IS WRONG
8309   033532  022704  165252          11$:    CMP     #165252,%4      ;IS HIGH ORDER = 165252
8310   033536  001401                          BEQ     12$
8311   033540  104000                          EMT                     ;HIGH ORDER IS WRONG
8312   033542  022705  100000          12$:    CMP     #100000,%4!1    ;IS LOW ORDER = 100000
8313   033546  001401                          BEQ     13$
8314   033550  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
8315   033552                          13$:
8316   033552  010105                          MOV     R1,R5           ;RESTORE R5
8317   033554  005215                          INC     (R5)
8318
8319
8320                                   ;*************************************************************************
8321                                   ;TEST:233       MUL     107070 * #107070 = 31222 26100          PS = 1
8322                                   ;*************************************************************************
8323
8324   033556                          TST233:
8325   033556  012700  107070                  MOV     #107070,%0      ;LOAD MULTIPLICAND WITH 107070
8326   033562  070027  107070                  MUL     #107070,%0      ;MULTIPLY 107070 * #107070
8327   033566  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
8328   033572  122737  000001  025414          CMPB    #1,@#PSWORD     ;IS PS = 1
8329   033600  001401                          BEQ     11$
8330   033602  104000                          EMT                     ;PS IS WRONG
8331   033604  022700  031222          11$:    CMP     #31222,%0       ;IS HIGH ORDER = 31222
8332   033610  001401                          BEQ     12$
8333   033612  104000                          EMT                     ;HIGH ORDER IS WRONG
8334   033614  022701  026100          12$:    CMP     #26100,%0!1     ;IS LOW ORDER = 26100
8335   033620  001401                          BEQ     13$
8336   033622  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
8337   033624                          13$:
8338   033624  005215                          INC     (R5)
8339
8340
8341                                   ;*************************************************************************
8342                                   ;TEST:234       MUL     -1 * #1 = -1 -1         PS = 10
8343                                   ;*************************************************************************
8344
8345   033626                          TST234:
8346   033626  012701  177777                  MOV     #-1,%1          ;LOAD MULTIPLICAND WITH -1
8347   033632  070127  000001                  MUL     #1,%1           ;MULTIPLY -1 * #1
8348   033636  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
8349   033642  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS PS = 10
8350   033650  001401                          BEQ     11$
8351   033652  104000                          EMT                     ;PS IS WRONG
8352   033654  022701  177777          11$:    CMP     #-1,%1          ;IS HIGH ORDER = -1
8353   033660  001401                          BEQ     12$
8354   033662  104000                          EMT                     ;HIGH ORDER IS WRONG
8355   033664  022701  177777          12$:    CMP     #-1,%1!1        ;IS LOW ORDER = -1
```

```
 8356  033670  001401                        BEQ     13$
 8357  033672  104000                        EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8358  033674                              13$:
 8359  033674  005215                        INC     (R5)
 8360
 8361
 8362                                      ;*************************************************************************
 8363                                      ;TEST:235       MUL       -1 * #0 = 0 0         PS = 4
 8364                                      ;*************************************************************************
 8365
 8366  033676                            TST235:
 8367  033676  012703  177777                  MOV     #-1,%3          ;LOAD MULTIPLICAND WITH -1
 8368  033702  070327  000000                  MUL     #0,%3           ;MULTIPLY -1 * #0
 8369  033706  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 8370  033712  122737  000004  025414        CMPB    #4,@#PSWORD     ;IS PS = 4
 8371  033720  001401                        BEQ     11$
 8372  033722  104000                        EMT                     ;PS IS WRONG
 8373  033724  022703  000000          11$:  CMP     #0,%3           ;IS HIGH ORDER = 0
 8374  033730  001401                        BEQ     12$
 8375  033732  104000                        EMT                     ;HIGH ORDER IS WRONG
 8376  033734  022703  000000          12$:  CMP     #0,%3!1         ;IS LOW ORDER = 0
 8377  033740  001401                        BEQ     13$
 8378  033742  104000                        EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8379  033744                              13$:
 8380  033744  005215                        INC     (R5)
 8381
 8382
 8383                                      ;*************************************************************************
 8384                                      ;TEST:236       MUL       77777 * #100000 = 100000 100000       PS = 11
 8385                                      ;*************************************************************************
 8386
 8387  033746                            TST236:
 8388  033746  010501                          MOV     R5,R1           ;SAVE R5
 8389  033750  012705  077777                  MOV     #77777,%5       ;LOAD MULTIPLICAND WITH 77777
 8390  033754  070527  100000                  MUL     #100000,%5      ;MULTIPLY 77777 * #100000
 8391  033760  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 8392  033764  122737  000011  025414        CMPB    #11,@#PSWORD    ;IS PS = 11
 8393  033772  001401                        BEQ     11$
 8394  033774  104000                        EMT                     ;PS IS WRONG
 8395  033776  022705  100000          11$:  CMP     #100000,%5      ;IS HIGH ORDER = 100000
 8396  034002  001401                        BEQ     12$
 8397  034004  104000                        EMT                     ;HIGH ORDER IS WRONG
 8398  034006  022705  100000          12$:  CMP     #100000,%5!1    ;IS LOW ORDER = 100000
 8399  034012  001401                        BEQ     13$
 8400  034014  104000                        EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8401  034016                              13$:
 8402  034016  010105                          MOV     R1,R5           ;RESTORE R5
 8403  034020  005215                          INC     (R5)
 8404
 8405
 8406                                      ;*************************************************************************
 8407                                      ;TEST:237       MUL       -1 * #77777 = 100001 100001       PS = 10
 8408                                      ;*************************************************************************
 8409
 8410  034022                            TST237:
 8411  034022  012701  177777                  MOV     #-1,%1          ;LOAD MULTIPLICAND WITH -1
```

```
 8412  034026  070127  077777                 MUL     #77777,%1       ;MULTIPLY -1 * #77777
 8413  034032  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
 8414  034036  122737  000010  025414         CMPB    #10,@#PSWORD    ;IS PS = 10
 8415  034044  001401                         BEQ     11$
 8416  034046  104000                         EMT                     ;PS IS WRONG
 8417  034050  022701  100001         11$:    CMP     #100001,%1      ;IS HIGH ORDER = 100001
 8418  034054  001401                         BEQ     12$
 8419  034056  104000                         EMT                     ;HIGH ORDER IS WRONG
 8420  034060  022701  100001         12$:    CMP     #100001,%1!1    ;IS LOW ORDER = 100001
 8421  034064  001401                         BEQ     13$
 8422  034066  104000                         EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8423  034070                         13$:
 8424  034070  005215                         INC     (R5)
 8425
 8426
 8427                                 ;*****************************************************************************
 8428                                 ;TEST:240       MUL       77777 * #77777 = 1 1          PS = 1
 8429                                 ;*****************************************************************************
 8430
 8431  034072                         TST240:
 8432  034072  012703  077777                 MOV     #77777,%3       ;LOAD MULTIPLICAND WITH 77777
 8433  034076  070327  077777                 MUL     #77777,%3       ;MULTIPLY 77777 * #77777
 8434  034102  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
 8435  034106  122737  000001  025414         CMPB    #1,@#PSWORD     ;IS PS = 1
 8436  034114  001401                         BEQ     11$
 8437  034116  104000                         EMT                     ;PS IS WRONG
 8438  034120  022703  000001         11$:    CMP     #1,%3           ;IS HIGH ORDER = 1
 8439  034124  001401                         BEQ     12$
 8440  034126  104000                         EMT                     ;HIGH ORDER IS WRONG
 8441  034130  022703  000001         12$:    CMP     #1,%3!1         ;IS LOW ORDER = 1
 8442  034134  001401                         BEQ     13$
 8443  034136  104000                         EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8444  034140                         13$:
 8445  034140  005215                         INC     (R5)
 8446
 8447
 8448                                 ;*****************************************************************************
 8449                                 ;TEST:241       MUL       2 * #2 = 4 4          PS = 0
 8450                                 ;*****************************************************************************
 8451
 8452  034142                         TST241:
 8453  034142  010501                         MOV     R5,R1           ;SAVE R5
 8454  034144  012705  000002                 MOV     #2,%5           ;LOAD MULTIPLICAND WITH 2
 8455  034150  070527  000002                 MUL     #2,%5           ;MULTIPLY 2 * #2
 8456  034154  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
 8457  034160  122737  000000  025414         CMPB    #0,@#PSWORD     ;IS PS = 0
 8458  034166  001401                         BEQ     11$
 8459  034170  104000                         EMT                     ;PS IS WRONG
 8460  034172  022705  000004         11$:    CMP     #4,%5           ;IS HIGH ORDER = 4
 8461  034176  001401                         BEQ     12$
 8462  034200  104000                         EMT                     ;HIGH ORDER IS WRONG
 8463  034202  022705  000004         12$:    CMP     #4,%5!1         ;IS LOW ORDER = 4
 8464  034206  001401                         BEQ     13$
 8465  034210  104000                         EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8466  034212                         13$:
 8467  034212  010105                         MOV     R1,R5           ;RESTORE R5
```

```
 8468  034214  005215                          INC     (R5)
 8469
 8470
 8471  034216  012702  040000                  MOV     #40000,%2
 8472  034222  012703  025442                  MOV     #S5,%3
 8473  034226  012704  025444                  MOV     #S6,%4
 8474
 8475                                  ;*****************************************************************************
 8476                                  ;TEST:242       MUL     125252 * S5 = 165252 100000        PS = 11
 8477                                  ;*****************************************************************************
 8478
 8479  034232                          TST242:
 8480  034232  012700  125252                  MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8481  034236  070067  171200                  MUL     S5,%0           ;MULTIPLY 125252 * S5
 8482  034242  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 8483  034246  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS PS = 11
 8484  034254  001401                          BEQ     11$
 8485  034256  104000                          EMT                     ;PS IS WRONG
 8486  034260  022700  165252          11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8487  034264  001401                          BEQ     12$
 8488  034266  104000                          EMT                     ;HIGH ORDER IS WRONG
 8489  034270  022701  100000          12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8490  034274  001401                          BEQ     13$
 8491  034276  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8492  034300                          13$:
 8493  034300  005215                          INC     (R5)
 8494
 8495
 8496                                  ;*****************************************************************************
 8497                                  ;TEST:243       MUL     125252 * @S6 = 165252 100000        PS = 11
 8498                                  ;*****************************************************************************
 8499
 8500  034302                          TST243:
 8501  034302  012700  125252                  MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8502  034306  070077  171132                  MUL     @S6,%0          ;MULTIPLY 125252 * @S6
 8503  034312  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 8504  034316  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS PS = 11
 8505  034324  001401                          BEQ     11$
 8506  034326  104000                          EMT                     ;PS IS WRONG
 8507  034330  022700  165252          11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8508  034334  001401                          BEQ     12$
 8509  034336  104000                          EMT                     ;HIGH ORDER IS WRONG
 8510  034340  022701  100000          12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8511  034344  001401                          BEQ     13$
 8512  034346  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8513  034350                          13$:
 8514  034350  005215                          INC     (R5)
 8515
 8516
 8517                                  ;*****************************************************************************
 8518                                  ;TEST:244       MUL     125252 * @#S5 = 165252 100000        PS = 11
 8519                                  ;*****************************************************************************
 8520
 8521  034352                          TST244:
 8522  034352  012700  125252                  MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8523  034356  070037  025442                  MUL     @#S5,%0         ;MULTIPLY 125252 * @#S5
```

```
 8524  034362  106737  025414              MFPS    @#PSWORD        ;SAVE PS
 8525  034366  122737  000011  025414      CMPB    #11,@#PSWORD    ;IS PS = 11
 8526  034374  001401                      BEQ     11$
 8527  034376  104000                      EMT                     ;PS IS WRONG
 8528  034400  022700  165252      11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8529  034404  001401                      BEQ     12$
 8530  034406  104000                      EMT                     ;HIGH ORDER IS WRONG
 8531  034410  022701  100000      12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8532  034414  001401                      BEQ     13$
 8533  034416  104000                      EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8534  034420                      13$:
 8535  034420  005215                      INC     (R5)
 8536
 8537
 8538                                      ;*************************************************************************
 8539                                      ;TEST:245       MUL      125252 * %2 = 165252 100000        PS = 11
 8540                                      ;*************************************************************************
 8541
 8542  034422                      TST245:
 8543  034422  012700  125252              MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8544  034426  070002                      MUL     %2,%0           ;MULTIPLY 125252 * %2
 8545  034430  106737  025414              MFPS    @#PSWORD        ;SAVE PS
 8546  034434  122737  000011  025414      CMPB    #11,@#PSWORD    ;IS PS = 11
 8547  034442  001401                      BEQ     11$
 8548  034444  104000                      EMT                     ;PS IS WRONG
 8549  034446  022700  165252      11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8550  034452  001401                      BEQ     12$
 8551  034454  104000                      EMT                     ;HIGH ORDER IS WRONG
 8552  034456  022701  100000      12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8553  034462  001401                      BEQ     13$
 8554  034464  104000                      EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8555  034466                      13$:
 8556  034466  005215                      INC     (R5)
 8557
 8558
 8559                                      ;*************************************************************************
 8560                                      ;TEST:246       MUL      125252 * (3)+ = 165252 100000      PS = 11
 8561                                      ;*************************************************************************
 8562
 8563  034470                      TST246:
 8564  034470  012700  125252              MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8565  034474  070023                      MUL     (3)+,%0         ;MULTIPLY 125252 * (3)+
 8566  034476  106737  025414              MFPS    @#PSWORD        ;SAVE PS
 8567  034502  122737  000011  025414      CMPB    #11,@#PSWORD    ;IS PS = 11
 8568  034510  001401                      BEQ     11$
 8569  034512  104000                      EMT                     ;PS IS WRONG
 8570  034514  022700  165252      11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8571  034520  001401                      BEQ     12$
 8572  034522  104000                      EMT                     ;HIGH ORDER IS WRONG
 8573  034524  022701  100000      12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8574  034530  001401                      BEQ     13$
 8575  034532  104000                      EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8576  034534                      13$:
 8577  034534  005215                      INC     (R5)
 8578
 8579
```

```
 8580                                   ;*****************************************************************************
 8581                                   ;TEST:247       MUL      125252 * -(3) = 165252 100000        PS = 11
 8582                                   ;*****************************************************************************
 8583
 8584  034536                           TST247:
 8585  034536  012700  125252                  MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8586  034542  070043                          MUL     -(3),%0         ;MULTIPLY 125252 * -(3)
 8587  034544  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 8588  034550  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS PS = 11
 8589  034556  001401                          BEQ     11$
 8590  034560  104000                          EMT                     ;PS IS WRONG
 8591  034562  022700  165252          11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8592  034566  001401                          BEQ     12$
 8593  034570  104000                          EMT                     ;HIGH ORDER IS WRONG
 8594  034572  022701  100000          12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8595  034576  001401                          BEQ     13$
 8596  034600  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8597  034602                          13$:
 8598  034602  005215                          INC     (R5)
 8599
 8600
 8601                                   ;*****************************************************************************
 8602                                   ;TEST:250       MUL      125252 * 2(4) = 165252 100000        PS = 11
 8603                                   ;*****************************************************************************
 8604
 8605  034604                           TST250:
 8606  034604  012700  125252                  MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8607  034610  070064  000002                  MUL     2(4),%0         ;MULTIPLY 125252 * 2(4)
 8608  034614  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 8609  034620  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS PS = 11
 8610  034626  001401                          BEQ     11$
 8611  034630  104000                          EMT                     ;PS IS WRONG
 8612  034632  022700  165252          11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8613  034636  001401                          BEQ     12$
 8614  034640  104000                          EMT                     ;HIGH ORDER IS WRONG
 8615  034642  022701  100000          12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8616  034646  001401                          BEQ     13$
 8617  034650  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8618  034652                          13$:
 8619  034652  005215                          INC     (R5)
 8620
 8621
 8622                                   ;*****************************************************************************
 8623                                   ;TEST:251       MUL      125252 * @(4) = 165252 100000        PS = 11
 8624                                   ;*****************************************************************************
 8625
 8626  034654                           TST251:
 8627  034654  012700  125252                  MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8628  034660  070074  000000                  MUL     @(4),%0         ;MULTIPLY 125252 * @(4)
 8629  034664  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 8630  034670  122737  000011  025414          CMPB    #11,@#PSWORD    ;IS PS = 11
 8631  034676  001401                          BEQ     11$
 8632  034700  104000                          EMT                     ;PS IS WRONG
 8633  034702  022700  165252          11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8634  034706  001401                          BEQ     12$
 8635  034710  104000                          EMT                     ;HIGH ORDER IS WRONG
```

```
 8636  034712  022701  100000          12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8637  034716  001401                          BEQ     13$
 8638  034720  104000                          EMT                     ,LOW ORDER IS WRONG OR WRONG SEQUENCE
 8639  034722                          13$:
 8640  034722  005215                          INC     (R5)
 8641
 8642
 8643                                  ;*************************************************************************
 8644                                  ;TEST:252       MUL     125252 * @(4)+ = 165252 100000        PS = 11
 8645                                  ;*************************************************************************
 8646
 8647  034724                          TST252:
 8648  034724  012700  125252                 MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8649  034730  070034                          MUL     @(4)+,%0        ;MULTIPLY 125252 * @(4)+
 8650  034732  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
 8651  034736  122737  000011  025414        CMPB    #11,@#PSWORD    ;IS PS = 11
 8652  034744  001401                          BEQ     11$
 8653  034746  104000                          EMT                     ;PS IS WRONG
 8654  034750  022700  165252          11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8655  034754  001401                          BEQ     12$
 8656  034756  104000                          EMT                     ;HIGH ORDER IS WRONG
 8657  034760  022701  100000          12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8658  034764  001401                          BEQ     13$
 8659  034766  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8660  034770                          13$:
 8661  034770  005215                          INC     (R5)
 8662
 8663
 8664                                  ;*************************************************************************
 8665                                  ;TEST:253       MUL     125252 * @-(4) = 165252 100000        PS = 11
 8666                                  ;*************************************************************************
 8667
 8668  034772                          TST253:
 8669  034772  012700  125252                 MOV     #125252,%0      ;LOAD MULTIPLICAND WITH 125252
 8670  034776  070054                          MUL     @-(4),%0        ;MULTIPLY 125252 * @-(4)
 8671  035000  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
 8672  035004  122737  000011  025414        CMPB    #11,@#PSWORD    ;IS PS = 11
 8673  035012  001401                          BEQ     11$
 8674  035014  104000                          EMT                     ;PS IS WRONG
 8675  035016  022700  165252          11$:    CMP     #165252,%0      ;IS HIGH ORDER = 165252
 8676  035022  001401                          BEQ     12$
 8677  035024  104000                          EMT                     ;HIGH ORDER IS WRONG
 8678  035026  022701  100000          12$:    CMP     #100000,%0!1    ;IS LOW ORDER = 100000
 8679  035032  001401                          BEQ     13$
 8680  035034  104000                          EMT                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
 8681  035036                          13$:
 8682  035036  005215                          INC     (R5)
 8683
 8684
```

```
                                        ;*********************************
                                        ;     DIV INSTRUCTION TESTS
                                        ;*********************************


                                ;*************************************************************************
                                ;TEST:254       DIV     0 4 / #2 = 2        REM = 0       PS = 0
                                ;*************************************************************************

035040                          TST254:
035040  012700  000000                  MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
035044  012701  000004                  MOV     #4,%0+1         ;LOAD LOW ORDER WITH 4
035050  071027  000002                  DIV     #2,%0           ;DIVIDE BY #2
035054  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
035060  122737  000000  025414          CMPB    #0,@#PSWORD     ;IS PS = 0
035066  001401                          BEQ     11$
035070  104000                          EMT                     ;PS IS WRONG
035072  022700  000002          11$:    CMP     #2,%0           ;IS QUOTIENT = 2
035076  001401                          BEQ     12$
035100  104000                          EMT                     ;QUOTIENT IS WRONG
035102  022701  000000          12$:    CMP     #0,%0+1         ;IS REMAINDER = 0
035106  001401                          BEQ     13$
035110  104000                          EMT                     ;WRONG REMAINDER
035112                          13$:
035112  005215                          INC     (R5)

                                ;*************************************************************************
                                ;TEST:255       DIV     -1 -9. / #3 = -3        REM = 0       PS = 10
                                ;*************************************************************************

035114                          TST255:
035114  012702  177777                  MOV     #-1,%2          ;LOAD HIGH ORDER WITH -1
035120  012703  177767                  MOV     #-9.,%2+1       ;LOAD LOW ORDER WITH -9.
035124  071227  000003                  DIV     #3,%2           ;DIVIDE BY #3
035130  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
035134  122737  000010  025414          CMPB    #10,@#PSWORD    ;IS PS = 10
035142  001401                          BEQ     11$
035144  104000                          EMT                     ;PS IS WRONG
035146  022702  177775          11$:    CMP     #-3,%2          ;IS QUOTIENT = -3
035152  001401                          BEQ     12$
035154  104000                          EMT                     ;QUOTIENT IS WRONG
035156  022703  000000          12$:    CMP     #0,%2+1         ;IS REMAINDER = 0
035162  001401                          BEQ     13$
035164  104000                          EMT                     ;WRONG REMAINDER
035166                          13$:
035166  005215                          INC     (R5)

                                ;*************************************************************************
                                ;TEST:256       DIV     0 9. / #2 = 4        REM = 1       PS = 0
                                ;*************************************************************************

035170                          TST256:
035170  010501                          MOV     R5,R1           ;SAVE R5
035172  012704  000000                  MOV     #0,%4           ;LOAD HIGH ORDER WITH 0
035176  012705  000011                  MOV     #9.,%4+1        ;LOAD LOW ORDER WITH 9.
```

```
 8741  035202  071427  000002                 DIV     #2,%4           ;DIVIDE BY #2
 8742  035206  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
 8743  035212  122737  000000  025414         CMPB    #0,@#PSWORD     ;IS PS = 0
 8744  035220  001401                         BEQ     11$
 8745  035222  104000                         EMT                     ;PS IS WRONG
 8746  035224  022704  000004         11$:    CMP     #4,%4           ;IS QUOTIENT = 4
 8747  035230  001401                         BEQ     12$
 8748  035232  104000                         EMT                     ;QUOTIENT IS WRONG
 8749  035234  022705  000001         12$:    CMP     #1,%4+1         ;IS REMAINDER = 1
 8750  035240  001401                         BEQ     13$
 8751  035242  104000                         EMT                     ;WRONG REMAINDER
 8752  035244                         13$:
 8753  035244  010105                         MOV     R1,R5           ;RESTORE R5
 8754  035246  005215                         INC     (R5)
 8755
 8756                                 ;*******************************************************************
 8757                                 ;TEST:257      DIV     -1 -9. / #2 = -4       REM = -1      PS = 10
 8758                                 ;*******************************************************************
 8759
 8760  035250                         TST257:
 8761  035250  012700  177777                 MOV     #-1,%0          ;LOAD HIGH ORDER WITH -1
 8762  035254  012701  177767                 MOV     #-9.,%0+1       ;LOAD LOW ORDER WITH -9.
 8763  035260  071027  000002                 DIV     #2,%0           ;DIVIDE BY #2
 8764  035264  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
 8765  035270  122737  000010  025414         CMPB    #10,@#PSWORD    ;IS PS = 10
 8766  035276  001401                         BEQ     11$
 8767  035300  104000                         EMT                     ;PS IS WRONG
 8768  035302  022700  177774         11$:    CMP     #-4,%0          ;IS QUOTIENT = -4
 8769  035306  001401                         BEQ     12$
 8770  035310  104000                         EMT                     ;QUOTIENT IS WRONG
 8771  035312  022701  177777         12$:    CMP     #-1,%0+1        ;IS REMAINDER = -1
 8772  035316  001401                         BEQ     13$
 8773  035320  104000                         EMT                     ;WRONG REMAINDER
 8774  035322                         13$:
 8775  035322  005215                         INC     (R5)
 8776
 8777                                 ;*******************************************************************
 8778                                 ;TEST:260      DIV     0 2 / #-3 = 0       REM = 2      PS = 4
 8779                                 ;*******************************************************************
 8780
 8781  035324                         TST260:
 8782  035324  012702  000000                 MOV     #0,%2           ;LOAD HIGH ORDER WITH 0
 8783  035330  012703  000002                 MOV     #2,%2+1         ;LOAD LOW ORDER WITH 2
 8784  035334  071227  177775                 DIV     #-3,%2          ;DIVIDE BY #-3
 8785  035340  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
 8786  035344  122737  000004  025414         CMPB    #4,@#PSWORD     ;IS PS = 4
 8787  035352  001401                         BEQ     11$
 8788  035354  104000                         EMT                     ;PS IS WRONG
 8789  035356  022702  000000         11$:    CMP     #0,%2           ;IS QUOTIENT = 0
 8790  035362  001401                         BEQ     12$
 8791  035364  104000                         EMT                     ;QUOTIENT IS WRONG
 8792  035366  022703  000002         12$:    CMP     #2,%2+1         ;IS REMAINDER = 2
 8793  035372  001401                         BEQ     13$
 8794  035374  104000                         EMT                     ;WRONG REMAINDER
 8795  035376                         13$:
 8796  035376  005215                         INC     (R5)
```

```
                                ;*****************************************************************************
                                ;TEST:261       DIV     -1 -2 / #3 = 0       REM = -2      PS = 4
                                ;*****************************************************************************

                                TST261:
                                        MOV     R5,R1           ;SAVE R5
                                        MOV     #-1,%4          ;LOAD HIGH ORDER WITH -1
                                        MOV     #-2,%4+1        ;LOAD LOW ORDER WITH -2
                                        DIV     #3,%4           ;DIVIDE BY #3
                                        MFPS    @#PSWORD        ;SAVE PS
                                        CMPB    #4,@#PSWORD     ;IS PS = 4
                                        BEQ     11$
                                        EMT                     ;PS IS WRONG
                                11$:    CMP     #0,%4           ;IS QUOTIENT = 0
                                        BEQ     12$
                                        EMT                     ;QUOTIENT IS WRONG
                                12$:    CMP     #-2,%4+1        ;IS REMAINDER = -2
                                        BEQ     13$
                                        EMT                     ;WRONG REMAINDER
                                13$:
                                        MOV     R1,R5           ;RESTORE R5
                                        INC     (R5)

                                ;*****************************************************************************
                                ;TEST:262       DIV     -1 -1 / #1 = -1       REM = 0       PS = 10
                                ;*****************************************************************************

                                TST262:
                                        MOV     #-1,%0          ;LOAD HIGH ORDER WITH -1
                                        MOV     #-1,%0+1        ;LOAD LOW ORDER WITH -1
                                        DIV     #1,%0           ;DIVIDE BY #1
                                        MFPS    @#PSWORD        ;SAVE PS
                                        CMPB    #10,@#PSWORD    ;IS PS = 10
                                        BEQ     11$
                                        EMT                     ;PS IS WRONG
                                11$:    CMP     #-1,%0          ;IS QUOTIENT = -1
                                        BEQ     12$
                                        EMT                     ;QUOTIENT IS WRONG
                                12$:    CMP     #0,%0+1         ;IS REMAINDER = 0
                                        BEQ     13$
                                        EMT                     ;WRONG REMAINDER
                                13$:
                                        INC     (R5)

                                ;*****************************************************************************
                                ;TEST:263       DIV     0 0 / #1 = 0       REM = 0       PS = 4
                                ;*****************************************************************************

                                TST263:
                                        MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
                                        MOV     #0,%0+1         ;LOAD LOW ORDER WITH 0
                                        DIV     #1,%0           ;DIVIDE BY #1
                                        MFPS    @#PSWORD        ;SAVE PS
                                        CMPB    #4,@#PSWORD     ;IS PS = 4
                                        BEQ     11$
```

```
 8853  035564  104000                  EMT                     ;PS IS WRONG
 8854  035566  022700  000000  11$:    CMP     #0,%0           ;IS QUOTIENT = 0
 8855  035572  001401                  BEQ     12$
 8856  035574  104000                  EMT                     ;QUOTIENT IS WRONG
 8857  035576  022701  000000  12$:    CMP     #0,%0+1         ;IS REMAINDER = 0
 8858  035602  001401                  BEQ     13$
 8859  035604  104000                  EMT                     ;WRONG REMAINDER
 8860  035606                  13$:
 8861  035606  005215                  INC     (R5)
 8862
 8863                          ;*************************************************************************
 8864                          ;TEST:264      DIV     -1 125252 / #2 = 152525       REM = 0      PS = 10
 8865                          ;*********************** ***********************************************
 8866
 8867  035610                  TST264:
 8868  035610  012702  177777          MOV     #-1,%2          ;LOAD HIGH ORDER WITH -1
 8869  035614  012703  125252          MOV     #125252,%2+1    ;LOAD LOW ORDER WITH 125252
 8870  035620  071227  000002          DIV     #2,%2           ;DIVIDE BY #2
 8871  035624  106737  025414          MFPS    @#PSWORD        ;SAVE PS
 8872  035630  122737  000010  025414  CMPB    #10,@#PSWORD    ;IS PS = 10
 8873  035636  001401                  BEQ     11$
 8874  035640  104000                  EMT                     ;PS IS WRONG
 8875  035642  022702  152525  11$:    CMP     #152525,%2      ;IS QUOTIENT = 152525
 8876  035646  001401                  BEQ     12$
 8877  035650  104000                  EMT                     ;QUOTIENT IS WRONG
 8878  035652  022703  000000  12$:    CMP     #0,%2+1         ;IS REMAINDER = 0
 8879  035656  001401                  BEQ     13$
 8880  035660  104000                  EMT                     ;WRONG REMAINDER
 8881  035662                  13$:
 8882  035662  005215                  INC     (R5)
 8883
 8884                          ;*************************************************************************
 8885                          ;TEST:265      DIV     -1 -1 / #-1 = 1       REM = 0      PS = 0
 8886                          ;*************************************************************************
 8887
 8888  035664                  TST265:
 8889  035664  010501                  MOV     R5,R1           ;SAVE R5
 8890  035666  012704  177777          MOV     #-1,%4          ;LOAD HIGH ORDER WITH -1
 8891  035672  012705  177777          MOV     #-1,%4+1        ;LOAD LOW ORDER WITH -1
 8892  035676  071427  177777          DIV     #-1,%4          ;DIVIDE BY #-1
 8893  035702  106737  025414          MFPS    @#PSWORD        ;SAVE PS
 8894  035706  122737  000000  025414  CMPB    #0,@#PSWORD     ;IS PS = 0
 8895  035714  001401                  BEQ     11$
 8896  035716  104000                  EMT                     ;PS IS WRONG
 8897  035720  022704  000001  11$:    CMP     #1,%4           ;IS QUOTIENT = 1
 8898  035724  001401                  BEQ     12$
 8899  035726  104000                  EMT                     ;QUOTIENT IS WRONG
 8900  035730  022705  000000  12$:    CMP     #0,%4+1         ;IS REMAINDER = 0
 8901  035734  001401                  BEQ     13$
 8902  035736  104000                  EMT                     ;WRONG REMAINDER
 8903  035740                  13$:
 8904  035740  010105                  MOV     R1,R5           ;RESTORE R5
 8905  035742  005215                  INC     (R5)
 8906
 8907                          ;*************************************************************************
 8908                          ;TEST:266      DIV     25253 1 / #125252 = 100000       REM = 1      PS = 10
```

```
8909                                    ;*************************************************************************
8910
8911  035744                            TST266:
8912  035744  012700  025253                   MOV     #25253,%0       ;LOAD HIGH ORDER WITH 25253
8913  035750  012701  000001                   MOV     #1,%0+1         ;LOAD LOW ORDER WITH 1
8914  035754  071027  125252                   DIV     #125252,%0      ;DIVIDE BY #125252
8915  035760  106737  025414                   MFPS    @#PSWORD        ;SAVE PS
8916  035764  122737  000010  025414           CMPB    #10,@#PSWORD    ;IS PS = 10
8917  035772  001401                           BEQ     11$
8918  035774  104000                           EMT                     ;PS IS WRONG
8919  035776  022700  100000           11$:    CMP     #100000,%0      ;IS QUOTIENT = 100000
8920  036002  001401                           BEQ     12$
8921  036004  104000                           EMT                     ;QUOTIENT IS WRONG
8922  036006  022701  000001           12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
8923  036012  001401                           BEQ     13$
8924  036014  104000                           EMT                     ;WRONG REMAINDER
8925  036016                           13$:
8926  036016  005215                           INC     (R5)
8927
8928                                    ;*************************************************************************
8929                                    ;TEST:267      DIV     37777 77777 / #77777 = 77777       REM = 77776      PS = 0
8930                                    ;*************************************************************************
8931
8932  036020                            TST267:
8933  036020  012702  037777                   MOV     #37777,%2       ;LOAD HIGH ORDER WITH 37777
8934  036024  012703  077777                   MOV     #77777,%2+1     ;LOAD LOW ORDER WITH 77777
8935  036030  071227  077777                   DIV     #77777,%2       ;DIVIDE BY #77777
8936  036034  106737  025414                   MFPS    @#PSWORD        ;SAVE PS
8937  036040  122737  000000  025414           CMPB    #0,@#PSWORD     ;IS PS = 0
8938  036046  001401                           BEQ     11$
8939  036050  104000                           EMT                     ;PS IS WRONG
8940  036052  022702  077777           11$:    CMP     #77777,%2       ;IS QUOTIENT = 77777
8941  036056  001401                           BEQ     12$
8942  036060  104000                           EMT                     ;QUOTIENT IS WRONG
8943  036062  022703  077776           12$:    CMP     #77776,%2+1     ;IS REMAINDER = 77776
8944  036066  001401                           BEQ     13$
8945  036070  104000                           EMT                     ;WRONG REMAINDER
8946  036072                           13$:
8947  036072  005215                           INC     (R5)
8948
8949                                    ;*************************************************************************
8950                                    ;TEST:270      DIV     0 100000 / #2 = 40000       REM = 0      PS = 0
8951                                    ;*************************************************************************
8952
8953  036074                            TST270:
8954  036074  010501                           MOV     R5,R1           ;SAVE R5
8955  036076  012704  000000                   MOV     #0,%4           ;LOAD HIGH ORDER WITH 0
8956  036102  012705  100000                   MOV     #100000,%4+1    ;LOAD LOW ORDER WITH 100000
8957  036106  071427  000002                   DIV     #2,%4           ;DIVIDE BY #2
8958  036112  106737  025414                   MFPS    @#PSWORD        ;SAVE PS
8959  036116  122737  000000  025414           CMPB    #0,@#PSWORD     ;IS PS = 0
8960  036124  001401                           BEQ     11$
8961  036126  104000                           EMT                     ;PS IS WRONG
8962  036130  022704  040000           11$:    CMP     #40000,%4       ;IS QUOTIENT = 40000
8963  036134  001401                           BEQ     12$
8964  036136  104000                           EMT                     ;QUOTIENT IS WRONG
```

```
8965  036140  022705  000000          12$:    CMP     #0,%4+1         ;IS REMAINDER = 0
8966  036144  001401                          BEQ     13$
8967  036146  104000                          EMT                     ;WRONG REMAINDER
8968  036150                          13$:
8969  036150  010105                          MOV     R1,R5           ;RESTORE R5
8970  036152  005215                          INC     (R5)
8971
8972                                  ;*************************************************************************
8973                                  ;TEST:271       DIV     177777 77777 / #177776 = 40000      REM = 177777      PS = 0
8974                                  ;*************************************************************************
8975
8976  036154                          TST271:
8977  036154  012700  177777                 MOV     #177777,%0      ;LOAD HIGH ORDER WITH 177777
8978  036160  012701  077777                 MOV     #77777,%0+1     ;LOAD LOW ORDER WITH 77777
8979  036164  071027  177776                 DIV     #177776,%0      ;DIVIDE BY #177776
8980  036170  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
8981  036174  122737  000000  025414        CMPB    #0,@#PSWORD     ;IS PS = 0
8982  036202  001401                          BEQ     11$
8983  036204  104000                          EMT                     ;PS IS WRONG
8984  036206  022700  040000          11$:    CMP     #40000,%0       ;IS QUOTIENT = 40000
8985  036212  001401                          BEQ     12$
8986  036214  104000                          EMT                     ;QUOTIENT IS WRONG
8987  036216  022701  177777          12$:    CMP     #177777,%0+1    ;IS REMAINDER = 177777
8988  036222  001401                          BEQ     13$
8989  036224  104000                          EMT                     ;WRONG REMAINDER
8990  036226                          13$:
8991  036226  005215                          INC     (R5)
8992
8993                                  ;*************************************************************************
8994                                  ;TEST:272       DIV     0 52525 / #52525 = 1        REM = 0       PS = 0
8995                                  ;*************************************************************************
8996
8997  036230                          TST272:
8998  036230  012702  000000                 MOV     #0,%2           ;LOAD HIGH ORDER WITH 0
8999  036234  012703  052525                 MOV     #52525,%2+1     ;LOAD LOW ORDER WITH 52525
9000  036240  071227  052525                 DIV     #52525,%2       ;DIVIDE BY #52525
9001  036244  106737  025414                 MFPS    @#PSWORD        ;SAVE PS
9002  036250  122737  000000  025414        CMPB    #0,@#PSWORD     ;IS PS = 0
9003  036256  001401                          BEQ     11$
9004  036260  104000                          EMT                     ;PS IS WRONG
9005  036262  022702  000001          11$:    CMP     #1,%2           ;IS QUOTIENT = 1
9006  036266  001401                          BEQ     12$
9007  036270  104000                          EMT                     ;QUOTIENT IS WRONG
9008  036272  022703  000000          12$:    CMP     #0,%2+1         ;IS REMAINDER = 0
9009  036276  001401                          BEQ     13$
9010  036300  104000                          EMT                     ;WRONG REMAINDER
9011  036302                          13$:
9012  036302  005215                          INC     (R5)
9013
9014                                  ;*************************************************************************
9015                                  ;TEST:273       DIV     0 77777 / #0 = DUMMY        REM = DUMMY       PS = 3
9016                                  ;*************************************************************************
9017
9018  036304                          TST273:
9019  036304  010501                          MOV     R5,R1           ;SAVE R5
9020  036306  012704  000000                 MOV     #0,%4           ;LOAD HIGH ORDER WITH 0
```

```
 9021  036312  012705  077777                    MOV     #77777,%4+1     ;LOAD LOW ORDER WITH 77777
 9022  036316  071427  000000                    DIV     #0,%4           ;DIVIDE BY #0
 9023  036322  106737  025414                    MFPS    @#PSWORD        ;SAVE PS
 9024  036326  042737  000014  025414            BIC     #14,@#PSWORD
 9025  036334  122737  000003  025414            CMPB    #3,@#PSWORD     ;IS PS = 3
 9026  036342  001401                            BEQ     13$
 9027  036344  104000                            EMT                     ;PS IS WRONG
 9028  036346                                13$:
 9029  036346  010105                            MOV     R1,R5           ;RESTORE R5
 9030  036350  005215                            INC     (R5)
 9031
 9032                                    ;*************************************************************************
 9033                                    ;TEST:274      DIV     77777 177777 / #2 = DUMMY       REM = DUMMY      PS = 2
 9034                                    ;*************************************************************************
 9035
 9036  036352                            TST274:
 9037  036352  012700  077777                    MOV     #77777,%0       ;LOAD HIGH ORDER WITH 77777
 9038  036356  012701  177777                    MOV     #177777,%0+1    ;LOAD LOW ORDER WITH 177777
 9039  036362  071027  000002                    DIV     #2,%0           ;DIVIDE BY #2
 9040  036366  106737  025414                    MFPS    @#PSWORD        ;SAVE PS
 9041  036372  042737  000014  025414            BIC     #14,@#PSWORD
 9042  036400  122737  000002  025414            CMPB    #2,@#PSWORD     ;IS PS = 2
 9043  036406  001401                            BEQ     13$
 9044  036410  104000                            EMT                     ;PS IS WRONG
 9045  036412                                13$:
 9046  036412  005215                            INC     (R5)
 9047
 9048  036414  012702  000002                    MOV     #2,%2
 9049  036420  012703  025452                    MOV     #S9,%3
 9050  036424  012704  025454                    MOV     #S10,%4
 9051
 9052                                    ;*************************************************************************
 9053                                    ;TEST:275      DIV     0 52525 / S9 = 25252        REM = 1      PS = 0
 9054                                    ;*************************************************************************
 9055
 9056  036430                            TST275:
 9057  036430  012700  000000                    MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9058  036434  012701  052525                    MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9059  036440  071067  167006                    DIV     S9,%0           ;DIVIDE BY S9
 9060  036444  106737  025414                    MFPS    @#PSWORD        ;SAVE PS
 9061  036450  122737  000000  025414            CMPB    #0,@#PSWORD     ;IS PS = 0
 9062  036456  001401                            BEQ     11$
 9063  036460  104000                            EMT                     ;PS IS WRONG
 9064  036462  022700  025252            11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9065  036466  001401                            BEQ     12$
 9066  036470  104000                            EMT                     ;QUOTIENT IS WRONG
 9067  036472  022701  000001            12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9068  036476  001401                            BEQ     13$
 9069  036500  104000                            EMT                     ;WRONG REMAINDER
 9070  036502                                13$:
 9071  036502  005215                            INC     (R5)
 9072
 9073                                    ;*************************************************************************
 9074                                    ;TEST:276      DIV     0 52525 / @S10 = 25252       REM = 1      PS = 0
 9075                                    ;*************************************************************************
 9076
```

```
                                                                    H 14
 9077  036504                          TST276:
 9078  036504  012700  000000                  MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9079  036510  012701  052525                  MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9080  036514  071077  166734                  DIV     @S10,%0         ;DIVIDE BY @S10
 9081  036520  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 9082  036524  122737  000000  025414          CMPB    #0,@#PSWORD     ;IS PS = 0
 9083  036532  001401                          BEQ     11$
 9084  036534  104000                          EMT                     ;PS IS WRONG
 9085  036536  022700  025252          11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9086  036542  001401                          BEQ     12$
 9087  036544  104000                          EMT                     ;QUOTIENT IS WRONG
 9088  036546  022701  000001          12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9089  036552  001401                          BEQ     13$
 9090  036554  104000                          EMT                     ;WRONG REMAINDER
 9091  036556                          13$:
 9092  036556  005215                          INC     (R5)
 9093
 9094                                  ;*****************************************************************************
 9095                                  ;TEST:277      DIV     0 52525 / @#S9 = 25252       REM = 1      PS = 0
 9096                                  ;*****************************************************************************
 9097
 9098  036560                          TST277:
 9099  036560  012700  000000                  MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9100  036564  012701  052525                  MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9101  036570  071037  025452                  DIV     @#S9,%0         ;DIVIDE BY @#S9
 9102  036574  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 9103  036600  122737  000000  025414          CMPB    #0,@#PSWORD     ;IS PS = 0
 9104  036606  001401                          BEQ     11$
 9105  036610  104000                          EMT                     ;PS IS WRONG
 9106  036612  022700  025252          11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9107  036616  001401                          BEQ     12$
 9108  036620  104000                          EMT                     ;QUOTIENT IS WRONG
 9109  036622  022701  000001          12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9110  036626  001401                          BEQ     13$
 9111  036630  104000                          EMT                     ;WRONG REMAINDER
 9112  036632                          13$:
 9113  036632  005215                          INC     (R5)
 9114
 9115                                  ;*****************************************************************************
 9116                                  ;TEST:300      DIV     0 52525 / %2 = 25252       REM = 1      PS = 0
 9117                                  ;*****************************************************************************
 9118
 9119  036634                          TST300:
 9120  036634  012700  000000                  MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9121  036640  012701  052525                  MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9122  036644  071002                          DIV     %2,%0           ;DIVIDE BY %2
 9123  036646  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 9124  036652  122737  000000  025414          CMPB    #0,@#PSWORD     ;IS PS = 0
 9125  036660  001401                          BEQ     11$
 9126  036662  104000                          EMT                     ;PS IS WRONG
 9127  036664  022700  025252          11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9128  036670  001401                          BEQ     12$
 9129  036672  104000                          EMT                     ;QUOTIENT IS WRONG
 9130  036674  022701  000001          12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9131  036700  001401                          BEQ     13$
 9132  036702  104000                          EMT                     ;WRONG REMAINDER
```

```
 9133  036704
 9134  036704  005215                    13$:
                                               INC     (R5)
 9135
 9136                                    ;*************************************************************************
 9137                                    ;TEST:301      DIV     0 52525 / (3)+ = 25252       REM = 1      PS = 0
 9138                                    ;*************************************************************************
 9139
 9140  036706                            TST301:
 9141  036706  012700  000000                   MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9142  036712  012701  052525                   MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9143  036716  071023                           DIV     (3)+,%0         ;DIVIDE BY (3)+
 9144  036720  106737  025414                   MFPS    @#PSWORD        ;SAVE PS
 9145  036724  122737  000000  025414           CMPB    #0,@#PSWORD     ;IS PS = 0
 9146  036732  001401                           BEQ     11$
 9147  036734  104000                           EMT                     ;PS IS WRONG
 9148  036736  022700  025252           11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9149  036742  001401                           BEQ     12$
 9150  036744  104000                           EMT                     ;QUOTIENT IS WRONG
 9151  036746  022701  000001           12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9152  036752  001401                           BEQ     13$
 9153  036754  104000                           EMT                     ;WRONG REMAINDER
 9154  036756                            13$:
 9155  036756  005215                           INC     (R5)
 9156
 9157                                    ;*************************************************************************
 9158                                    ;TEST:302      DIV     0 52525 / -(3) = 25252       REM = 1      PS = 0
 9159                                    ;*************************************************************************
 9160
 9161  036760                            TST302:
 9162  036760  012700  000000                   MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9163  036764  012701  052525                   MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9164  036770  071043                           DIV     -(3),%0         ;DIVIDE BY -(3)
 9165  036772  106737  025414                   MFPS    @#PSWORD        ;SAVE PS
 9166  036776  122737  000000  025414           CMPB    #0,@#PSWORD     ;IS PS = 0
 9167  037004  001401                           BEQ     11$
 9168  037006  104000                           EMT                     ;PS IS WRONG
 9169  037010  022700  025252           11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9170  037014  001401                           BEQ     12$
 9171  037016  104000                           EMT                     ;QUOTIENT IS WRONG
 9172  037020  022701  000001           12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9173  037024  001401                           BEQ     13$
 9174  037026  104000                           EMT                     ;WRONG REMAINDER
 9175  037030                            13$:
 9176  037030  005215                           INC     (R5)
 9177
 9178                                    ;*************************************************************************
 9179                                    ;TEST:303      DIV     0 52525 / 2(4) = 25252       REM = 1      PS = 0
 9180                                    ;*************************************************************************
 9181
 9182  037032                            TST303:
 9183  037032  012700  000000                   MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9184  037036  012701  052525                   MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9185  037042  071064  000002                   DIV     2(4),%0         ;DIVIDE BY 2(4)
 9186  037046  106737  025414                   MFPS    @#PSWORD        ;SAVE PS
 9187  037052  122737  000000  025414           CMPB    #0,@#PSWORD     ;IS PS = 0
 9188  037060  001401                           BEQ     11$
```

```
 9189  037062  104000                          EMT                     ;PS IS WRONG
 9190  037064  022700  025252          11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9191  037070  001401                          BEQ     12$
 9192  037072  104000                          EMT                     ;QUOTIENT IS WRONG
 9193  037074  022701  000001          12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9194  037100  001401                          BEQ     13$
 9195  037102  104000                          EMT                     ;WRONG REMAINDER
 9196  037104                          13$:
 9197  037104  005215                          INC     (R5)
 9198
 9199                                  ;*****************************************************************************
 9200                                  ;TEST:304       DIV     0 52525 / @(4) = 25252       REM = 1      PS = 0
 9201                                  ;*****************************************************************************
 9202
 9203  037106                          TST304:
 9204  037106  012700  000000                  MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9205  037112  012701  052525                  MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9206  037116  071074  000000                  DIV     @(4),%0         ;DIVIDE BY @(4)
 9207  037122  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 9208  037126  122737  000000  025414          CMPB    #0,@#PSWORD     ;IS PS = 0
 9209  037134  001401                          BEQ     11$
 9210  037136  104000                          EMT                     ;PS IS WRONG
 9211  037140  022700  025252          11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9212  037144  001401                          BEQ     12$
 9213  037146  104000                          EMT                     ;QUOTIENT IS WRONG
 9214  037150  022701  000001          12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9215  037154  001401                          BEQ     13$
 9216  037156  104000                          EMT                     ;WRONG REMAINDER
 9217  037160                          13$:
 9218  037160  005215                          INC     (R5)
 9219
 9220                                  ;*****************************************************************************
 9221                                  ;TEST:305       DIV     0 52525 / @(4)+ = 25252      REM = 1      PS = 0
 9222                                  ;*****************************************************************************
 9223
 9224  037162                          TST305:
 9225  037162  012700  000000                  MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9226  037166  012701  052525                  MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9227  037172  071034                          DIV     @(4)+,%0        ;DIVIDE BY @(4)+
 9228  037174  106737  025414                  MFPS    @#PSWORD        ;SAVE PS
 9229  037200  122737  000000  025414          CMPB    #0,@#PSWORD     ;IS PS = 0
 9230  037206  001401                          BEQ     11$
 9231  037210  104000                          EMT                     ;PS IS WRONG
 9232  037212  022700  025252          11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9233  037216  001401                          BEQ     12$
 9234  037220  104000                          EMT                     ;QUOTIENT IS WRONG
 9235  037222  022701  000001          12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9236  037226  001401                          BEQ     13$
 9237  037230  104000                          EMT                     ;WRONG REMAINDER
 9238  037232                          13$:
 9239  037232  005215                          INC     (R5)
 9240
 9241                                  ;*****************************************************************************
 9242                                  ;TEST:306       DIV     0 52525 / @-(4) = 25252      REM = 1      PS = 0
 9243                                  ;*****************************************************************************
 9244
```

```
 9245  037234                                TST306:
 9246  037234  012700  000000                      MOV     #0,%0           ;LOAD HIGH ORDER WITH 0
 9247  037240  012701  052525                      MOV     #52525,%0+1     ;LOAD LOW ORDER WITH 52525
 9248  037244  071054                              DIV     @-(4),%0        ;DIVIDE BY @-(4)
 9249  037246  106737  025414                      MFPS    @#PSWORD        ;SAVE PS
 9250  037252  122737  000000  025414              CMPB    #0,@#PSWORD     ;IS PS = 0
 9251  037260  001401                              BEQ     11$
 9252  037262  104000                              EMT                     ;PS IS WRONG
 9253  037264  022700  025252              11$:    CMP     #25252,%0       ;IS QUOTIENT = 25252
 9254  037270  001401                              BEQ     12$
 9255  037272  104000                              EMT                     ;QUOTIENT IS WRONG
 9256  037274  022701  000001              12$:    CMP     #1,%0+1         ;IS REMAINDER = 1
 9257  037300  001401                              BEQ     13$
 9258  037302  104000                              EMT                     ;WRONG REMAINDER
 9259  037304                              13$:
 9260  037304  005215                              INC     (R5)
 9261
 9262
 9263
 9264                                      ;SPECIAL MULTIPLY DATA PATTERN TEST
 9265
 9266  037306  012701  177777              TSTSPC: MOV     #-1,R1          ;MAKE R1 -1 SO WE KNOW INSTR. WAS MODIFIER
 9267  037312  012700  077700                      MOV     #77700,R0       ;SET UP TEST DATA
 9268  037316  070027  000001                      MUL     #1,R0           ;DO MULTIPLY INSTRUCTION
 9269  037322  022701  077700                      CMP     #77700,R1       ;CHECK LOW ORDER WORD
 9270  037326  001401                              BEQ     1$
 9271  037330  104000                              EMT                     ;LOW ORDER PRODUCT ERROR
 9272  037332  005700                      1$:     TST     R0              ;CHECK HIGH ORDER WORD
 9273  037334  001401                              BEQ     EISEND
 9274  037336  104000                              EMT                     ;HIGH ORDER PRODUCT ERROR
 9275  037340  000167  000026              EISEND: JMP     MMUTST          ;JMP OVER GARBAGE AND GET TO MMU TEST
```

```
                                .SBTTL  MEMORY MANAGEMENT DEFINITIONS

                                ;*KT11 VECTOR ADDRESS

000250                          MMVEC=  250

                                ;*KT11 STATUS REGISTER ADDRESSES

177572                          SR0=    177572
177574                          SR1=    177574
177576                          SR2=    177576
172516                          SR3=    172516

                                ;*USER "I" PAGE DESCRIPTOR REGISTERS

177600                          UIPDR0= 177600
177602                          UIPDR1= 177602
177604                          UIPDR2= 177604
177606                          UIPDR3= 177606
177610                          UIPDR4= 177610
177612                          UIPDR5= 177612
177614                          UIPDR6= 177614
177616                          UIPDR7= 177616

                                ;*USER "I" PAGE ADDRESS REGISTERS

177640                          UIPAR0= 177640
177642                          UIPAR1= 177642
177644                          UIPAR2= 177644
177646                          UIPAR3= 177646
177650                          UIPAR4= 177650
177652                          UIPAR5= 177652
177654                          UIPAR6= 177654
177656                          UIPAR7= 177656

                                ;*KERNEL "I" PAGE DESCRIPTOR REGISTERS

172300                          KIPDR0= 172300
172302                          KIPDR1= 172302
172304                          KIPDR2= 172304
172306                          KIPDR3= 172306
172310                          KIPDR4= 172310
172312                          KIPDR5= 172312
172314                          KIPDR6= 172314
172316                          KIPDR7= 172316

                                ;*KERNEL "I" PAGE ADDRESS REGISTERS

172340                          KIPAR0= 172340
172342                          KIPAR1= 172342
172344                          KIPAR2= 172344
172346                          KIPAR3= 172346
172350                          KIPAR4= 172350
172352                          KIPAR5= 172352
172354                          KIPAR6= 172354
```

```
                    172356          KIPAR7= 172356

                    000006          KSP=    SP
                    000006          USP=    SP
                    177776          PSW=    PS
                    000020          TBIT=   20
                    000100          WBIT=   100
                    000001          BIT0=   1
                    000004          ERRVEC= 4

                                    ;*ADDITIONAL DEFINITIONS
                                    ;*

037344  000000      WASR6:  .WORD   0       ;USED TO STORE THE STACK POINTER AFTER A TRAP
037346  000000      TRAPPC: .WORD   0       ;USED TO STORE THE PC OF A TRAP OR ABORT
037350  000000      TRAPPS: .WORD   0       ;USED TO STORE THE PS OF A TRAP OR ABORT
037352  000000      WASSR0: .WORD   0       ;USED TO STORE CONTENTS OF SR0
037354  000000      WASSR2: .WORD   0       ;USED TO STORE CONTENTS OR SR2
037356  000000      TBITPS: .WORD   0       ;SAVES THE PSW THAT MAY HAVE ITS T-BIT ON
037360  000000      $TMP0:  .WORD   0       ;TEMPORARY STORAGE LOCATION
037362  000000      $TMP1:  .WORD   0       ;TEMPORARY STORAGE LOCATION
037364  000000      $TMP2:  .WORD   0       ;TEMPORARY STORAGE LOCATION
037366  000000      $TMP3:  .WORD   0       ;TEMPORARY STORAGE LOCATION
037370  000000      $TMP4:  .WORD   0       ;TEMPORARY STORAGE LOCATION
```

```
 9360
 9361  037372  012706  001000          MMUTST: MOV     #STBOT,KSP      ;INITIALIZE THE STACK POINTER
 9362  037376  012767  021356  140644          MOV     #T0250,MMVEC    ;LOAD MEMORY MANAGENT ROUTINE INTO VECTOR
 9363  037404  012767  000340  140640          MOV     #340,MMVEC+2    ;SET NEW PS TO PRIORITY LEVEL 7-KERNEL
 9364  037412  012767  000340  177736          MOV     #340,TBITPS     ;INITIALIZE LOG THAT HOLDS T-BIT PSW
 9365  037420  005067  140146                  CLR     SR0             ;BE SURE MEM. MGMT IS OFF TO START WITH
 9366  037424  000244                          CLZ                     ;CLR THE Z BIT
 9367  037426  032777  000001  161750          BIT     #1,@SWR
 9368  037434  001402                          BEQ     1$
 9369  037436  000167  011076                  JMP     EXATST
 9370  037442  012737  050434  000030  1$:     MOV     #ERROR3,@#30    ;SET UP EMT VECTOR TO GO TO RIGHT ERROR CALL
 9371  037450  012737  000002  001004          MOV     #2,@#$TESTN     ;INCREMENT TEST NUMBER
 9372
```

```
                                ;*****************************************************************************
                                ;TEST 351       PSW PRIORITY BIT TEST
                                ;*****************************************************************************
037456                          TS351:
037456  005000                        CLR     R0              ;INITIALIZE R0 WITH PRIORITY=0 DATA
037460  005001          2$:     CLR     R1              ;PREPARE R1 TO ACCEPT DATA READ
037462  106400                  MTPS    R0              ;WRITE PRIORITY BITS IN THE PSW
037464  106701                  MFPS    R1              ;READ BACK THE LOW BYTE OF PSW
037466  042701  177437          BIC     #177437,R1      ;MASK OFF EVERYTHING EXCEPT PRIORITY BITS
037472  020001                  CMP     R0,R1           ;WAS CORRECT PRIORITY SET IN THE PSW?
037474  001401                  BEQ     3$
037476  104000                  EMT                     ;PRIORITY BITS SET WRONG IN PSW
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;'BR 2$' = 000770
037500  062700  000040  3$:     ADD     #40,R0          ;CHANGE DATA TO NEXT PRIORITY
037504  022700  000400          CMP     #400,R0         ;HAVE PRIORITIES 0-7 ALL BEEN CHECKED?
037510  001363                  BNE     2$              ;BRANCH IF NO

                                ;*****************************************************************************
                                ;TEST 352       PSW MODE BIT TEST
                                ;*****************************************************************************
037512                          TS352:
037512  005000                        CLR     R0              ;INITIALIZE R0 WITH MODE BITS = 0000
037514  005067  140256  2$:     CLR     PSW             ;INITIALIZE PSW
037520  050067  140252          BIS     R0,PSW          ;BIT SET THE PSW MODE BITS WITH R0
037524  016701  140246          MOV     PSW,R1          ;READ BACK THE CONTENTS OF THE PSW
037530  042701  007777          BIC     #007777,R1      ;MASK OFF EVERYTHING EXCEPT THE MODE BITS
037534  020001                  CMP     R0,R1           ;WERE THE MODE BITS SET CORRECTLY?
037536  001401                  BEQ     3$
037540  104000                  EMT                     ;MODE BITS SET WRONG IN PSW
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;'BR 2$' = 000763
037542  062700  010000  3$:     ADD     #10000,R0       ;CHANGE MODE BIT DATA
037546  001362                  BNE     2$              ;BRANCH IF STILL MORE COMBINATIONS
037550  005067  140222          CLR     PSW             ;RESET PSW BEFORE LEAVING

                                ;*****************************************************************************
                                ;TEST 353       BYTE ADDRESSING TEST FOR PSW
                                ;*****************************************************************************
037554                          TS353:
037554  005067  140216  2$:     CLR     PSW             ;CLEAR THE PSW
037560  012700  000360          MOV     #360,R0         ;PUT THE HIGH BYTE DATA INTO R0
037564  110067  140207          MOVB    R0,PSW+1        ;WRITE THE HIGH BYTE OF THE PSW
037570  016701  140202          MOV     PSW,R1          ;READ BACK THE ENTIRE PSW
037574  042701  007437          BIC     #007437,R1      ;MASK OFF THE T & CC BITS
037600  000300                  SWAB    R0              ;GET DATA WRITTEN IN HIGH BYTE OF R0
037602  020001                  CMP     R0,R1           ;WAS THE PSW WRITTEN TO CORRECTLY
037604  001401                  BEQ     4$
037606  104000                  EMT                     ;LOW BYTE EFFECTED BY WRITE TO HIGH BYTE OF PSW
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;'BR 2$' = 000760
```

```
 9429  037610  005067  140162          4$:     CLR     PSW             ;CLEAR THE PSW
 9430  037614  012700  000340                  MOV     #340,R0         ;PUT THE LOW BYTE DATA INTO R0
 9431  037620  110067  140152                  MOVB    R0,PSW          ;WRITE THE LOW BYTE OF THE PSW
 9432  037624  016701  140146                  MOV     PSW,R1          ;READ BACK THE ENTIRE PSW
 9433  037630  042701  007437                  BIC     #007437,R1      ;MASK OFF THE T&CC BITS
 9434  037634  020001                          CMP     R0,R1           ;WAS PSW WRITTEN TO CORRECTLY
 9435  037636  001401                          BEQ     TS354
 9436  037640  104000                          EMT                     ;HIGH BYTE EFFECTED BY WRITE TO LOW BYTE OF PSW
 9437                                                                  ;FOR TIGHTER SCOPE LOOP
 9438                                                                  ;REPLACE ERROR CALL WITH
 9439                                                                  ;'BR 2$' = 000736
 9440
 9441                                  ;*****************************************************************************
 9442                                  ;TEST 354       TEST AND SETUP OF STACK POINTERS
 9443                                  ;*****************************************************************************
 9444  037642                          TS354:
 9445  037642  005067  140130                  CLR     PSW             ;GO TO KERNEL MODE
 9446  037646  012706  001000                  MOV     #KERSTK,KSP     ;SET KERNEL STACK POINTER TO 1100
 9447  037652  012767  140000  140116          MOV     #140000,PSW     ;GO TO USER MODE
 9448  037660  012706  000600                  MOV     #USESTK,USP     ;SET USER STACK POINTER TO 700
 9449  037664  005067  140106                  CLR     PSW             ;BACK TO KERNEL MODE
 9450  037670  022706  001000                  CMP     #KERSTK,KSP     ;IS KERNEL R6 STILL 1100?
 9451  037674  001401                          BEQ     TS355
 9452  037676  104000                          EMT                     ;KERNEL R6 CHANGED BY WRITING USER R6
 9453                                                                  ;FOR TIGHTER SCOPE LOOP
 9454                                                                  ;REPLACE ERROR CALL WITH
 9455                                                                  ;000756
 9456
 9457                                  ;*****************************************************************************
 9458                                  ;*
 9459                                  ;*      THE NEXT FIVE (5) TESTS WILL TRY TO ADDRESS ALL OF THE
 9460                                  ;*      MEMORY MANAGEMENT REGISTERS (SR0,SR1,SR2,KERNEL & USER PAR/PDR'S).
 9461                                  ;*      EVERY TIME A REGISTER TIMES OUT ITS ADDRESS WILL BE REPORTED.
 9462                                  ;*      AT THE END OF EACH TEST A SUMMARY OF THE ADDRESSES THAT TIMED
 9463                                  ;*      OUT DURING THAT TEST IS GIVEN.  THE RESULTS OF ''AND-ING'' AND ''OR-ING''
 9464                                  ;*      THEIR ADDRESSES IS GIVEN TO SHOW WHICH ADDRESS LINES MAY BE
 9465                                  ;*      STUCK AT 0 OR 1.  THE PAR/PDR ADDRESS AND KT MUX'S ARE THE
 9466                                  ;*      THINGS BEING CHECKED.
 9467                                  ;*
 9468                                  ;*****************************************************************************
 9469
 9470
 9471                                  ;*****************************************************************************
 9472                                  ;TEST 355       SR0,SR1,SR2,SR3 TIMEOUT TEST
 9473                                  ;*****************************************************************************
 9474  037700                          TS355:
 9475  037700  012700  177572                  MOV     #SR0,R0         ;LOAD R0 WITH ADDRESS OF FIRST REG.
 9476  037704  012701  000003                  MOV     #3,R1           ;LOAD R1 WITH THE LOOP COUNT
 9477  037710  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A STATUS REGISTER
 9478                                                                  ;IF IT TIMES OUT GO TO 5$
 9479  037712  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT ADDRESS IN R0
 9480  037716  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
 9481  037720  005737  172516                  TST     @#172516        ;CHECK SR3 FOR RESPONSE
 9482
 9483                                  ;*****************************************************************************
 9484                                  ;TEST 356       KERNEL PAR'S TIMEOUT TEST
```

```
9485
9486  037724
9487
9488  037724  012700  172340          ;*****************************************************************************
9489  037730  012701  000010          TS356:
9490  037734  005710
9491                                          MOV     #KIPAR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
9492  037736  062700  000002                 MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
9493  037742  077104                 2$:     TST     (R0)            ;TRY ADDRESSING A KIPAR
9494                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
9495                                  3$:     ADD     #2,R0           ;PUT NEXT KIPAR ADDRESS IN R0
9496                                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
9497
9498  037744                          ;*****************************************************************************
9499                                  ;TEST 357       KERNEL PDR'S TIMEOUT TEST
9500  037744  012700  172300          ;*****************************************************************************
9501  037750  012701  000010          TS357:
9502  037754  005710
9503                                          MOV     #KIPDR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
9504  037756  062700  000002                 MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
9505  037762  077104                 2$:     TST     (R0)            ;TRY ADDRESSING A KIPDR
9506                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
9507                                  3$:     ADD     #2,R0           ;PUT NEXT KIPDR ADDRESS IN R0
9508                                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
9509
9510  037764                          ;*****************************************************************************
9511                                  ;TEST 360       USER PAR'S TIMEOUT TEST
9512  037764  012700  177640          ;*****************************************************************************
9513  037770  012701  000010          TS360:
9514  037774  005710
9515                                          MOV     #UIPAR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
9516  037776  062700  000002                 MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
9517  040002  077104                 2$:     TST     (R0)            ;TRY ADDRESSING A UIPAR
9518                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
9519                                  3$:     ADD     #2,R0           ;PUT NEXT UIPAR ADDRESS IN R0
9520                                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
9521
9522  040004                          ;*****************************************************************************
9523                                  ;TEST 361       USER PDR'S TIMEOUT TEST
9524  040004  012700  177600          ;*****************************************************************************
9525  040010  012701  000010          TS361:
9526  040014  005710
9527                                          MOV     #UIPDR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
9528  040016  062700  000002                 MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
9529  040022  077104                 2$:     TST     (R0)            ;TRY ADDRESSING A UIPDR
9530                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
9531                                  3$:     ADD     #2,R0           ;PUT NEXT UIPDR ADDRESS IN R0
9532                                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
9533
9534  040024                          ;*****************************************************************************
9535                                  ;TEST 362       SR0(15:13) BIT TEST & SR2 TEST
9536  040024  012700  177572          ;*****************************************************************************
9537  040030  012710  160000          TS362:
9538  040034  000005
9539  040036  011001                  1$:     MOV     #SR0,R0         ;LOAD ADDRESS OF SR0 INTO R0
9540  040040  001401                          MOV     #160000,(R0)    ;SET BITS <15:13> IN SR0 (ERROR BITS)
                                              RESET                   ;ISSUE AND "INIT" SIGNAL
                                              MOV     (R0),R1         ;READ SR0 INTO R1 TO SEE IF CLEAR
                                              BEQ     2$
```

```
 9541  040042  104000                          EMT                     ;SR0<15:13> NOT CLEARED BY A 'RESET'
 9542                                                                  ;FOR TIGHTER SCOPE LOOP
 9543                                                                  ;REPLACE ERROR CALL WITH
 9544                                                                  ;'BR 1$' = 000770
 9545  040044  016767  137526  177302  2$:     MOV     SR2,WASSR2      ;READ CONTENTS OF SR2
 9546  040052  012701  040044          2$:     MOV     #2$,R1          ;LOAD EXPECTED CONTENTS INTO R1
 9547  040056  020167  177272                  CMP     R1,WASSR2       ;IS SR2 TRACKING?
 9548  040062  001401                          BEQ     3$
 9549  040064  104000                          EMT                     ;SR2 NOT 'TRACKING' VIRTUAL ADDRESSES
 9550                                                                  ;FOR TIGHTER SCOPE LOOP
 9551                                                                  ;REPLACE ERROR CALL WITH
 9552                                                                  ;'BR 2$' = 000767
 9553  040066  012701  100000          3$:     MOV     #100000,R1      ;PUT DATA TO BE WRITTEN IN R1
 9554  040072  012703  000003                  MOV     #3,R3           ;SETUP R3 AS A LOOP COUNTER
 9555  040076  005010          4$:     CLR     (R0)                    ;CLEAR SR0
 9556  040100  050110          5$:     BIS     R1,(R0)                 ;SET ONE OF THE ERROR BITS IN SR0
 9557  040102  011002                  MOV     (R0),R2                 ;READ SR0 INTO R2
 9558  040104  020102                  CMP     R1,R2                   ;DID RIGHT ERROR BIT GET SET?
 9559  040106  001401                  BEQ     6$
 9560  040110  104000                  EMT                             ;BITS WERE SET WRONG IN SR0
 9561                                                                  ;FOR TIGHTER SCOPE LOOP
 9562                                                                  ;REPLACE ERROR CALL WITH
 9563                                                                  ;'BR 4$' = 000772
 9564  040112  012704  040100          6$:     MOV     #5$,R4          ;LOAD EXPECTED CONTENTS OF SR2 IN R4
 9565  040116  016767  137454  177230          MOV     SR2,WASSR2      ;READ SR2
 9566  040124  020467  177224                  CMP     R4,WASSR2       ;DID SR2 LOCK UP WHEN ERROR
 9567                                                                  ;BIT SET IN SR1?
 9568  040130  001401                          BEQ     7$
 9569  040132  104000                          EMT                     ;SR2 DID NOT LOCK UP
 9570                                                                  ;FOR TIGHTER SCOPE LOOP
 9571                                                                  ;REPLACE ERROR CALL WITH
 9572                                                                  ;'BR 4$' = 000761
 9573  040134  006001          7$:     ROR     R1                      ;CHANGE DATA TO CHECK NEXT ERROR BIT
 9574  040136  077321                  SOB     R3,4$                   ;LOOP BACK UNTIL <15:13> ALL TESTED
 9575  040140  005010                  CLR     (R0)                    ;CLEAR SR0 BEFORE LEAVING
 9576
 9577                          ;*****************************************************************************
 9578                          ;TEST 363       SR0 & PSW DUAL ADDRESSING TEST
 9579                          ;*****************************************************************************
 9580  040142                  TS363:
 9581
 9582  040142  005067  137630  1$:     CLR     PSW                     ;CLEAR THE PSW
 9583  040146  005067  137420          CLR     SR0                     ;CLEAR STATUS REGISTER 0
 9584  040152  106427  000340          MTPS    #340                    ;SET PRIORITY 7 IN LOW BYTE OF PSW
 9585  040156  016700  137410          MOV     SR0,R0                  ;READ STATUS REGISTER 0
 9586  040162  001401                  BEQ     2$
 9587  040164  104000                  EMT                             ;SR0 EFFECTED BY A WRITE TO THE PSW
 9588                                                                  ;FOR TIGHTER SCOPE LOOP
 9589                                                                  ;REPLACE ERROR CALL WITH
 9590                                                                  ;'BR 1$' = 000767
 9591  040166  005067  137400  2$:     CLR     SR0                     ;BE SURE SR0 IS 0 BEFORE LEAVING
 9592  040172  005067  137600          CLR     PSW                     ;BE SURE PSW IS 0 BEFORE LEAVING
 9593
 9594                          ;*****************************************************************************
 9595                          ;TEST 364       TEST THAT SR1 READS ALL ZEROS
 9596                          ;*****************************************************************************
```

```
 9597  040176                          TS364:
 9598  040176  012700  177777          1$:     MOV     #-1,R0          ;FILL R0 WITH ALL ONES
 9599  040202  016700  137366                  MOV     SR1,R0          ;READ SR1 INTO R0
 9600  040206  001401                          BEQ     2$
 9601  040210  104000                          EMT                     ;SR1 DID NOT READ ALL ZEROS
 9602                                                                  ;FOR TIGHTER SCOPE LOOP
 9603                                                                  ;REPLACE ERROR CALL WITH
 9604                                                                  ;000772
 9605  040212  012767  177777  132276  2$:     MOV     #-1,SR3         ;TRY TO WRITE ONES TO SR3
 9606  040220  022767  000060  132270          CMP     #60,SR3         ;ONLY BITS <5:4> SHOULD BE ONES
 9607  040226  001401                          BEQ     3$
 9608  040230  104000                          EMT                     ;DIDN'T READ BACK A ''60''
 9609  040232  004567  010152          3$:     JSR     R5,CHKAPT
 9610  040236  000402                          BR      90$
 9611  040240  000005                          RESET                   ;CLEARS SR3
 9612  040242  000402                          BR      91$
 9613  040244  005067  132246          90$:    CLR     SR3
 9614  040250  005767  132242          91$:    TST     SR3             ;VERIFY THAT IT WAS CLEARED
 9615  040254                          4$:
 9616  040254  001401                          BEQ     TS365
 9617  040256  104000                          EMT                     ;SR3 DIDN'T READ ALL ZEROS
 9618
 9619
 9620                                  ;NOTE   F11 CHANGES INCLUDED CHECKING ALL BITS<15:0> OF PARS
 9621                                  ;       INSTEAD OF ONLY BITS<11:0>.
 9622
 9623                                  ;*******************************************************************************
 9624                                  ;TEST 365       BIT TEST OF KERNEL & USER PAR'S
 9625                                  ;*******************************************************************************
 9626  040260                          TS365:
 9627
 9628  040260  012700  172340          1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST PAR IN R0
 9629  040264  012703  000010          2$:     MOV     #10,R3          ;SETUP R3 TO COUNT 8 PAR'S
 9630  040270  005010                  3$:     CLR     (R0)            ;CLEAR THE PAR
 9631  040272  011001                          MOV     (R0),R1         ;READ THE PAR INTO R1
 9632  040274  001401                          BEQ     4$
 9633  040276  104000                          EMT                     ;PAR WOULD NOT CLEAR
 9634                                                                  ;FOR TIGHTER SCOPE LOOP
 9635                                                                  ;REPLACE ERROR CALL WITH
 9636                                                                  ;''BR 3$'' = 000774
 9637  040300  012704  077777          4$:     MOV     #077777,R4      ;LOAD ''WALKING 0'' TEST PATTERN IN R4
 9638  040304  005010                  5$:     CLR     (R0)            ;CLEAR THE PAR BEFORE LOADING DATA
 9639  040306  050410                          BIS     R4,(R0)         ;BIT SET THE TEST PATTERN INTO THE PAR
 9640  040310  011002                          MOV     (R0),R2         ;READ THE PAR INTO R2
 9641  040312  020402                          CMP     R4,R2           ;DOES DATA WRITTEN=DATA READ?
 9642  040314  001401                          BEQ     6$
 9643  040316  104000                          EMT                     ;PAR BITS DID NOT SET CORRECTLY
 9644                                                                  ;FOR TIGHTER SCOPE LOOP
 9645                                                                  ;REPLACE ERROR CALL WITH
 9646                                                                  ;''BR 5$'' = 000767
 9647  040320  000261                  6$:     SEC                     ;SET THE C-BIT FOR THE ROTATE INST.
 9648  040322  006004                          ROR     R4              ;ROTATE THE TEST PATTERN IN R4
 9649  040324  103767                          BCS     5$              ;BRANCH BACK IF MORE BITS TO TEST
 9650  040326  062700  000002                  ADD     #2,R0           ;GET NEXT PAR ADDRESS IN R0
 9651  040332  077322                          SOB     R3,3$           ;BRANCH BACK UNTIL ALL PAR'S TESTED
 9652  040334  022700  177660                  CMP     #UIPAR7+2,R0    ;HAVE USER PAR'S BEEN TESTED
```

```
 9653  040340  103003                    BHIS    TS366           ;GET TO NEXT TEST
 9654  040342  012700  177640            MOV     #UIPAR0,R0      ;LOAD FIRST USER PAR ADDR. IN R0
 9655  040346  000746                    BR      2$              ;BRANCH BACK TO TEST USER PAR'S
 9656                                                            ;LEAVE TEST WITH BITS <11:1>=1 IN ALL PAR'S
 9657                              ;*****************************************************************************
 9658                              ;TEST 366       BIT TEST OF KERNEL & USER PDR'S
 9659                              ;*****************************************************************************
 9660  040350                      TS366:
 9661
 9662  040350  012700  172300      1$:     MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST PDR IN R0
 9663  040354  012703  000010      2$:     MOV     #10,R3          ;SETUP R3 TO COUNT 8 PDR'S
 9664  040360  005010              3$:     CLR     (R0)            ;CLEAR THE PDR
 9665  040362  011001                      MOV     (R0),R1         ;READ THE PDR INTO R1
 9666  040364  001401                      BEQ     4$
 9667  040366  104000                      EMT                     ;PDR WOULD NOT CLEAR
 9668                                                            ;FOR TIGHTER SCOPE LOOP
 9669                                                            ;REPLACE ERROR CALL WITH
 9670                                                            ;"BR 3$" = 000774
 9671  040370  012704  077777      4$:     MOV     #077777,R4      ;LOAD "WALKING "0" TEST PATTERN IN R4
 9672  040374  005010              5$:     CLR     (R0)            ;CLEAR THE PDR BEFORE LOADING DATA
 9673  040376  010401                      MOV     R4,R1           ;LOAD DATA INTO R1
 9674  040400  042701  100361              BIC     #100361,R1      ;MASK UNUSED BITS OUT OF THE DATA
 9675  040404  050110                      BIS     R1,(R0)         ;BIT SET THE TEST PATTERN INTO THE PDR
 9676  040406  011002                      MOV     (R0),R2         ;READ THE PDR INTO R2
 9677  040410  020102                      CMP     R1,R2           ;DOES DATA WRITTEN=DATA READ?
 9678  040412  001401                      BEQ     6$
 9679  040414  104000                      EMT                     ;PDR BITS DID NOT SET CORRECTLY
 9680                                                            ;FOR TIGHTER SCOPE LOOP
 9681                                                            ;REPLACE ERROR CALL WITH
 9682                                                            ;"BR 5$" = 000767
 9683  040416  000261              6$:     SEC                     ;SET THE C-BIT FOR THE ROTATE INST.
 9684  040420  006004                      ROR     R4              ;ROTATE THE TEST PATTERN IN R4
 9685  040422  103764                      BCS     5$              ;BRANCH BACK IF MORE BITS TO TEST
 9686  040424  062700  000002              ADD     #2,R0           ;GET NEXT PDR ADDRESS IN R0
 9687  040430  077325                      SOB     R3,3$           ;BRANCH BACK UNTIL ALL PDR'S TESTED
 9688  040432  022700  177620              CMP     #UIPDR7+2,R0    ;HAVE USER PDR'S BEEN TESTED?
 9689  040436  103003                      BHIS    TS367           ;GET TO NEXT TEST
 9690  040440  012700  177600              MOV     #UIPDR0,R0      ;LOAD FIRST USER PDR ADDR. IN R0
 9691  040444  000743                      BR      2$              ;BRANCH BACK TO TEST USER PDR'S
 9692                                                            ;LEAVE TEST WITH ALL WRITEABLE BITS IN
 9693                                                            ;ALL PDR'S = 1
 9694
 9695                              ;*****************************************************************************
 9696                              ;TEST 367       TEST FOR DUAL BYTE ADDRESSING OF KERNEL & USER PAR'S
 9697                              ;*****************************************************************************
 9698  040446                      TS367:
 9699
 9700  040446  012700  172340      1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST PAR INTO R0
 9701  040452  012703  000010              MOV     #10,R3          ;LOAD LOOP COUNTER TO DO 8 PAR'S
 9702  040456  012701  177777      3$:     MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
 9703  040462  005010                      CLR     (R0)            ;CLEAR THE PAR
 9704  040464  110110                      MOVB    R1,(R0)         ;WRITE 1'S TO THE LOW BYTE OF THE PAR
 9705  040466  011002                      MOV     (R0),R2         ;READ THE ENTIRE PAR INTO R2
 9706  040470  042701  177400              BIC     #177400,R1      ;MASK HIGH BYTE & UNUSED BITS OUT OF THE DATA
 9707  040474  020102                      CMP     R1,R2           ;WAS ONLY THE LOW BYTE WRITTEN TO
 9708  040476  001401                      BEQ     5$
```

```
 9709  040500  104000                        EMT                             ;HIGH BYTE EFFECTED BY WRITING LOW BYTE IN PAR
 9710                                                                        ;FOR TIGHTER SCOPE LOOP
 9711                                                                        ;REPLACE ERROR CALL WITH
 9712                                                                        ;'BR 3$" = 000766
 9713  040502  005010                  5$:   CLR     (R0)                    ;CLEAR THE PAR
 9714  040504  012701  177777                MOV     #-1,R1                  ;LOAD TEST, PATTERN INTO R1
 9715  040510  110160  000001                MOVB    R1,1(R0)                ;WRITE 1'S TO THE HIGH BYTE OF THE PAR
 9716  040514  011002                        MOV     (R0),R2                 ;READ THE ENTIRE PAR INTO R2
 9717                                                                        ;F11 CHANGE     WAS #170377
 9718  040516  042701  000377                BIC     #000377,R1              ;MASK LOW BYTE & UNUSED BITS OUT OF DATA
 9719  040522  020102                        CMP     R1,R2                   ;WAS ONLY THE HIGH BYTE WRITTEN TO?
 9720  040524  001401                        BEQ     6$
 9721  040526  104000                        EMT                             ;LOW BYTE EFFECTED BY WRITING HIGH BYTE IN PAR
 9722                                                                        ;FOR TIGHTER SCOPE LOOP
 9723                                                                        ;REPLACE ERROR CALL WITH
 9724                                                                        ;'BR 5" = 000765
 9725  040530  062700  000002                6$:   ADD     #2,R0                   ;PUT ADDRESS OF NEXT PAR IN R0
 9726  040534  077330                        SOB     R3,3$                   ;BRANCH BACK UNTIL 8 PAR'S TESTED
 9727  040536  022700  177660                CMP     #UIPAR7+2,R0            ;HAVE USER PAR'S BEEN TESTED
 9728  040542  103003                        BHIS    TS370                   ;GET TO NEXT TEST
 9729  040544  012700  177640                MOV     #UIPAR0,R0              ;LOAD ADDRESS OF FIRST USER PAR IN R0
 9730  040550  000742                        BR      3$                      ;BRANCH BACK TO TEST USER PAR'S
 9731
 9732                                  ;*****************************************************************************
 9733                                  ;TEST 370       TEST FOR DUAL BYTE ADDRESSING OF KERNEL & USER PDR'S
 9734                                  ;*****************************************************************************
 9735  040552                          TS370:
 9736
 9737  040552  012700  172300          1$:   MOV     #KIPDR0,R0              ;LOAD ADDRESS OF FIRST PDR INTO R0
 9738  040556  012703  000010                MOV     #10,R3                  ;LOAD LOOP COUNTER TO DO 8 PDR'S
 9739  040562  012701  177777          3$:   MOV     #-1,R1                  ;LOAD TEST PATTERN INTO R1
 9740  040566  005010                        CLR     (R0)                    ;CLEAR THE PDR
 9741  040570  110110                        MOVB    R1,(R0)                 ;WRITE 1'S TO THE LOW BYTE OF THE PDR
 9742  040572  011002                        MOV     (R0),R2                 ;READ THE ENTIRE PDR INTO R2
 9743  040574  042701  177761                BIC     #177761,R1              ;MASK HIGH BYTE & UNUSED BITS OUT OF DATA
 9744  040600  020102                        CMP     R1,R2                   ;WAS ONLY THE LOW BYTE WRITTEN TO?
 9745  040602  001401                        BEQ     5$
 9746  040604  104000                        EMT                             ;HIGH BYTE EFFECTED BY WRITING LOW BYTE IN PDR
 9747                                                                        ;FOR TIGHTER SCOPE LOOP
 9748                                                                        ;REPLACE ERROR CALL WITH
 9749                                                                        ;'BR 3$" = 000766
 9750  040606  005010                  5$:   CLR     (R0)                    ;CLEAR THE PDR
 9751  040610  012701  177777                MOV     #-1,R1                  ;LOAD TEST PATTERN INTO R1
 9752  040614  110160  000001                MOVB    R1,1(R0)                ;WRITE 1'S TO THE HIGH BYTE OF THE PDR
 9753  040620  011002                        MOV     (R0),R2                 ;READ THE ENTIRE PDR INTO R2
 9754  040622  042701  100377                BIC     #100377,R1              ;MASK LOW BYTE & UNUSED BITS OUT OF DATA
 9755  040626  020102                        CMP     R1,R2                   ;WAS ONLY THE HIGH BYTE WRITTEN TO?
 9756  040630  001401                        BEQ     6$
 9757  040632  104000                        EMT                             ;LOW BYTE EFFECTED BY WRITING HIGH BYTE IN PDR
 9758                                                                        ;FOR TIGHTER SCOPE LOOP
 9759                                                                        ;REPLACE ERROR CALL WITH
 9760                                                                        ;'BR 5$" = 000765
 9761  040634  062700  000002          6$:   ADD     #2,R0                   ;PUT ADDRESS OF NEXT PDR IN R0
 9762  040640  077330                        SOB     R3,3$                   ;BRANCH BACK UNTIL 8 PDR'S TESTED
 9763  040642  022700  177620                CMP     #UIPDR7+2,R0            ;HAVE USER PDR'S BEEN TESTED?
 9764  040646  103003                        BHIS    TS371                   ;GET TO NEXT TEST
```

```
                        MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
                        BR      3$              ;BRANCH BACK TO TEST USER PDR'S

;*****************************************************************************************
;TEST 371       PAR-PDR DUAL ADDRESSING TEST
;*****************************************************************************************
TS371:

                        MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
                        MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR AND R0
                        JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S IN PDR'S
2$:                     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
                        CLR     (R0)            ;CLEAR ONE OF THE KERNEL PDR'S
                        JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
                        MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT PDR
                        SOB     R3,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CHECKED
                        MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
                        MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
3$:                     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
                        CLR     (R0)            ;CLEAR ONE OF THE KERNEL PAR'S
                        JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
                        MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT PAR
                        SOB     R3,3$           ;LOOP TO 3$ UNTIL ALL KERNEL PAR'S CHECKED
                        MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
                        MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
4$:                     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
                        CLR     (R0)            ;CLEAR ONE OF THE USER PDR'S
                        JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
                        MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT UPDR
                        SOB     R3,4$           ;LOOP TO 4$ UNTIL ALL USER PDR'S CHECKED
                        MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
                        MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
5$:                     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
                        CLR     (R0)            ;CLEAR ONE OF THE USER PAR'S
                        JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
                        MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT UPAR
                        SOB     R3,5$           ;LOOP TO 5$ UNTIL ALL USER PAR'S CHECKED

;*****************************************************************************************
;TEST 372       TEST THAT PAR-PDR'S NOT AFFECTED BY RESET
;*****************************************************************************************
TS372:

                        BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
                        BEQ     70$             ;IF NO THEN DO TEST
                        TST     @#$PASS         ;IS THIS FIRST PASS
                        BNE     TS373           ;IF NO THEN SHIP TO NEXT TEST
70$:
1$:                     JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S AND PDR'S
                        RESET                   ;ISSUE AN "INIT" BY EXECUTING A RESET
10$:                    MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R0
                        MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2$:                     MOV     (R0),R1         ;READ A KERNEL PDR INTO R1
                        CMP     #77416,R1       ;ARE ALL THE BITS STILL SET?
                        BEQ     3$
```

```
 9821  041066  104000                    EMT                             ;KERNEL PDR AFFECTED BY A RESET
 9822                                                                    ;FOR TIGHTER SCOPE LOOP
 9823                                                                    ;REPLACE ERROR CALL WITH
 9824                                                                    ;'BR 2$'' = 000773
 9825  041070  062700  000002      3$:   ADD     #2,R0                   ;FORM ADDRESS OF NEXT KERNEL PDR
 9826  041074  077410                    SOB     R4,2$                   ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CHECKED
 9827  041076  012700  172340            MOV     #KIPAR0,R0              ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
 9828  041102  012704  000010            MOV     #10,R4                  ;LOAD LOOP COUNTER WITH AN 8
 9829  041106  011001              4$:   MOV     (R0),R1                 ;READ A KERNEL PAR INTO R1
 9830                                                                    ;****F11 CHANGE****     WAS #7777
 9831  041110  022701  177777            CMP     #177777,R1              ;ARE ALL THE BITS STILL SET?
 9832  041114  001401                    BEQ     5$
 9833  041116  104000                    EMT                             ;KERNEL PAR AFFECTED BY A RESET
 9834                                                                    ;FOR TIGHTER SCOPE LOOP
 9835                                                                    ;REPLACE ERROR CALL WITH
 9836                                                                    ;'BR 4$'' = 000773
 9837  041120  062700  000002      5$:   ADD     #2,R0                   ;FORM ADDRESS OF NEXT KERNEL PAR
 9838  041124  077410                    SOB     R4,4$                   ;LOOP TO 4$ UNTIL ALL KERNEL PAR'S CHECKED
 9839  041126  012700  177600            MOV     #UIPDR0,R0              ;LOAD ADDRESS OF FIRST USER PDR IN R0
 9840  041132  012704  000010            MOV     #10,R4                  ;LOAD LOOP COUNTER WITH AN 8
 9841  041136  011001              6$:   MOV     (R0),R1                 ;READ A USER PDR INTO R1
 9842  041140  022701  077416            CMP     #77416,R1               ;ARE ALL THE BITS STILL SET?
 9843  041144  001401                    BEQ     7$
 9844  041146  104000                    EMT                             ;USER PDR AFFECTED BY A RESET
 9845                                                                    ;FOR TIGHTER SCOPE LOOP
 9846                                                                    ;REPLACE ERROR CALL WITH
 9847                                                                    ;'BR 6$'' = 000773
 9848  041150  062700  000002      7$:   ADD     #2,R0                   ;FORM ADDRESS OF NEXT USER PDR
 9849  041154  077410                    SOB     R4,6$                   ;LOOP TO 6$ UNTIL ALL USER PDR'S CHECKED
 9850
 9851  041156  012700  177640            MOV     #UIPAR0,R0              ;LOAD ADDRESS OF FIRST USER PAR IN R0
 9852  041162  012704  000010            MOV     #10,R4                  ;LOAD LOOP COUNTER WITH AN 8
 9853  041166  011001              8$:   MOV     (R0),R1                 ;READ A USER PAR INTO R1
 9854                                                                    ;****F11 CHANGE****     WAS #7777
 9855  041170  022701  177777            CMP     #177777,R1              ;ARE ALL THE BITS STILL SET?
 9856  041174  001401                    BEQ     9$
 9857  041176  104000                    EMT                             ;USER PAR AFFECTED BY A RESET
 9858                                                                    ;FOR TIGHTER SCOPE LOOP
 9859                                                                    ;REPLACE ERROR CALL WITH
 9860                                                                    ;'BR 8$'' = 000773
 9861  041200  062700  000002      9$:   ADD     #2,R0                   ;FORM ADDRESS OF NEXT USER PAR
 9862  041204  077410                    SOB     R4,8$                   ;LOOP TO 8$ UNTIL ALL USER PAR'S CHECKED
 9863
 9864
 9865
 9866
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 9868
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 9875
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                                ;*****************************************************************************
                                ;TEST 373       RELOCATION & ADDER TEST (NO CARRIES)
                                ;*****************************************************************************
041206                          TS373:

041206  012700  172340        1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
041212  005001                        CLR     R1              ;CLEAR R1
041214  012702  000007                MOV     #7,R2           ;LOAD LOOP COUNTER WITH A 7
041220  010120                2$:     MOV     R1,(R0)+        ;MAP KERNEL PAR'S TO PAGES 0-6 (4K EACH)
041222  062701  000200                ADD     #200,R1
041226  077204                        SOB     R2,2$           ;LOOP UNTIL KIPAR0 - KIPAR6 ARE LOADED
041230  012710  177600                MOV     #177600,(R0)    ;MAP KIPAR7 TO THE I/O PAGE
041234  012700  172300                MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R0
041240  012701  077406                MOV     #77406,R1       ;LOAD PDR DATA INTO R1
041244  012702  000010                MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
041250  010120                3$:     MOV     R1,(R0)+        ;MAP ALL 8 PAGES 128 BLOCKS, UPWARD
041252  077202                        SOB     R2,3$           ;       EXPANDABLE, READ/WRITE

041254  012700  067776        4$:     MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
041260  012701  107776                MOV     #107776,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
041264  012702  125250                MOV     #125250,R2      ;LOAD TEST PATTERN INTO R2
041270  012704  000600                MOV     #600,R4 ;LOAD R4 WITH PAR VALUE
041274  010467  131050                MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
041300  011067  176054                MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
041304  005067  131206                CLR     SR3             ;SET UP FOR 18-BIT ADDRESSING
041310  052767  000001  136254        BIS     #BIT0,SR0       ;TURN ON 'RELOCATION"
041316  010211                        MOV     R2,(R1)         ;LOAD 125250 USING ADDER  (PAR4 + VIRT ADDR.)
041320  005067  136246                CLR     SR0             ;TURN OFF MEMORY MGMT.
041324  011003                        MOV     (R0),R3         ;READ 125250 BACK WITHOUT USING MEM. MGMT.
041326  016710  176026                MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
041332  020203                        CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
                                                            ;WRITTEN USING 'DEST-ONLY-RELOC."?
041334  001401                        BEQ     5$
041336  104000                        EMT                     ;TEST LOCATION DID NOT HAVE PATTERN
                                                            ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
                                                            ;APPARENTLY PHYSICAL ADDR. WAS
                                                            ;FORMED WRONG BY ADDERS USING
                                                            ;THE VIRTUAL ADDR. AND KIPAR4
                                                            ;FOR TIGHTER SCOPE LOOP
                                                            ;REPLACE ERROR CALL WITH
                                                            ;"BR 4$" = 000742
041340                          5$:
041340  012700  067776        6$:     MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
041344  012701  102576                MOV     #102576,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
041350  012702  125251                MOV     #125251,R2      ;LOAD TEST PATTERN INTO R2
041354  012704  000652                MOV     #652,R4 ;LOAD R4 WITH PAR VALUE
041360  010467  130764                MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
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 9933  041364  011067  175770            MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
 9934  041370  005067  131122            CLR     SR3             ;SET UP FOR 18-BIT ADDRESSING
 9935  041374  052767  000001  136170    BIS     #BIT0,SR0       ;TURN ON 'RELOCATION'
 9936  041402  010211                    MOV     R2,(R1)         ;LOAD 125251 USING ADDER  (PAR4 + VIRT ADDR.)
 9937  041404  005067  136162            CLR     SR0             ;TURN OFF MEMORY MGMT.
 9938  041410  011003                    MOV     (R0),R3         ;READ 125251 BACK WITHOUT USING MEM. MGMT.
 9939  041412  016710  175742            MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 9940  041416  020203                    CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
 9941                                                            ;WRITTEN USING 'DEST-ONLY-RELOC.'?
 9942  041420  001401                    BEQ     7$
 9943  041422  104000                    EMT                     ;TEST LOCATION DID NOT HAVE PATTERN
 9944                                                            ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 9945                                                            ;APPARENTLY PHYSICAL ADDR. WAS
 9946                                                            ;FORMED WRONG BY ADDERS USING
 9947                                                            ;THE VIRTUAL ADDR. AND KIPAR4
 9948                                                            ;FOR TIGHTER SCOPE LOOP
 9949                                                            ;REPLACE ERROR CALL WITH
 9950                                                            ;'BR 6$' = 000742
 9951  041424                    7$:
 9952  041424  012700  067776    8$:     MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
 9953  041430  012701  105276            MOV     #105276,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
 9954  041434  012702  125252            MOV     #125252,R2      ;LOAD TEST PATTERN INTO R2
 9955  041440  012704  000625            MOV     #625,R4 ;LOAD R4 WITH PAR VALUE
 9956  041444  010467  130700            MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
 9957  041450  011067  175704            MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
 9958  041454  052767  000020  131034    BIS     #BIT4,SR3       ;SET UP FOR 22-BIT ADDRESSING
 9959  041462  052767  000001  136102    BIS     #BIT0,SR0       ;TURN ON 'RELOCATION'
 9960  041470  010211                    MOV     R2,(R1)         ;LOAD 125252 USING ADDER  (PAR4 + VIRT ADDR.)
 9961  041472  005067  136074            CLR     SR0             ;TURN OFF MEMORY MGMT.
 9962  041476  011003                    MOV     (R0),R3         ;READ 125252 BACK WITHOUT USING MEM. MGMT.
 9963  041500  016710  175654            MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 9964  041504  020203                    CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
 9965                                                            ;WRITTEN USING 'DEST-ONLY-RELOC.'?
 9966  041506  001401                    BEQ     9$
 9967  041510  104000                    EMT                     ;TEST LOCATION DID NOT HAVE PATTERN
 9968                                                            ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 9969                                                            ;APPARENTLY PHYSICAL ADDR. WAS
 9970                                                            ;FORMED WRONG BY ADDERS USING
 9971                                                            ;THE VIRTUAL ADDR. AND KIPAR4
 9972                                                            ;FOR TIGHTER SCOPE LOOP
 9973                                                            ;REPLACE ERROR CALL WITH
 9974                                                            ;'BR 8$' = 000742
 9975  041512                    9$:
 9976
 9977  041512  012700  177776            MOV     #PSW,R0         ;LOAD PHYS. ADDR. OF PSW INTO R0
 9978  041516  012701  100076            MOV     #100076,R1      ;LOAD VIRTUAL ADDR. FOR PSW INTO R1
 9979  041522  012702  030340            MOV     #030340,R2      ;LOAD DATA FOR PSW IN R2
 9980  041526  012704  007777            MOV     #7777,R4        ;LOAD R4 WITH PAR VALUE
 9981  041532  010467  130612            MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
 9982  041536  005010                    CLR     (R0)            ;CLEAR THE PSW
 9983  041540  005067  130752            CLR     SR3             ;SET UP FOR 18-BIT ADDRESSING
 9984  041544  052767  000001  136020    BIS     #BIT0,SR0       ;TURN ON 'MEMORY MANAGEMENT'
 9985  041552  010211                    MOV     R2,(R1)         ;LOAD PSW USING ADDER (PAR4 + VIRT ADDR.)
 9986  041554  005067  136012            CLR     SR0             ;TURN OFF MEM. MGMT (SR0=0)
 9987  041560  011003                    MOV     (R0),R3         ;READ PSW BACK WITHOUT USING MEM. MGMT.
 9988  041562  005010                    CLR     (R0)            ;CLEAR THE PSW
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 9989  041564  042703  000037            BIC     #37,R3          ;MASK T-BIT & CC BITS OUT OF DATA READ
 9990  041570  020203                    CMP     R2,R3           ;WAS PSW WRITTEN?
 9991  041572  001401                    BEQ     11$
 9992  041574  104000                    EMT                     ;PSW DID NOT HAVE DATA THAT IT SHOULD HAVE,
 9993                                                            ;APPARENTLY PHYS. ADDR. OF PSW WAS
 9994                                                            ;NOT FORMED BY ADDERS USING THE
 9995                                                            ;VIRTUAL ADDR. AND KIPAR4
 9996                                                            ;FOR TIGHTER SCOPE LOOP
 9997                                                            ;REPLACE ERROR CALL WITH
 9998                                                            ;'BR 10$'' = 000742
 9999  041576  012700  177776        11$:    MOV     #PSW,R0         ;LOAD PHYS. ADDR. OF PSW INTO R0
10000  041602  012701  117776                MOV     #117776,R1      ;LOAD VIRTUAL ADDR. FOR PSW INTO R1
10001  041606  012702  030240                MOV     #030240,R2      ;LOAD DATA FOR PSW IN R2
10002  041612  012704  177600                MOV     #177600,R4      ;LOAD R4 WITH PAR VALUE
10003  041616  010467  130526                MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
10004  041622  052767  000020  130666        BIS     #BIT4,SR3       ;SET UP FOR 22-BIT ADDRESSING
10005  041630  052767  000001  135734        BIS     #BIT0,SR0       ;TURN ON 'MEMORY MANAGEMENT''
10006  041636  010211                    MOV     R2,(R1)         ;LOAD PSW USING ADDER (PAR4 + VIRT. ADDR.)
10007  041640  005067  135726                CLR     SR0             ;TURN OFF MEM. MGMT (SR0=0)
10008  041644  011003                    MOV     (R0),R3         ;READ PSW BACK WITHOUT USING MEM. MGMT.
10009  041646  005010                    CLR     (R0)            ;CLEAR THE PSW
10010  041650  042703  000037            BIC     #37,R3          ;MASK T-BIT & CC BITS OUT OF DATA READ
 0011  041654  020203                    CMP     R2,R3           ;WAS PSW WRITTEN WHILE IN MAINT. MODE?
 0012  041656  001401                    BEQ     TS374
10013  041660  104000                    EMT                     ;PSW DID NOT HAVE DATA THAT IT SHOULD
10014                                                            ;HAVE, APPARENTLY PHYS. ADDR. OF PSW WAS
10015                                                            ;NOT FORMED BY ADDERS USING THE
10016                                                            ;VIRTUAL ADDR. AND KIPAR4
10017                                                            ;FOR TIGHTER SCOPE LOOP
10018                                                            ;REPLACE ERROR CALL WITH
10019                                                            ;'BR 11$'' = 000743
10020
10021                                   ;*****************************************************************************
10022                                   ;TEST 374       RELOCATION & ADDER TEST (WITH CARRIES)
10023                                   ;*****************************************************************************
10024  041662                           TS374:
10025
10026  041662                           1$:                             ;KERNEL PAR'S AND PDR'S HAVE BEEN
10027                                                                    ;SETUP BY THE PREVIOUS TEST
10028  041662  012700  066476        2$:     MOV     #66476,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
10029  041666  012701  114376                MOV     #114376,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
10030  041672  012702  125253                MOV     #125253,R2      ;LOAD TEST PATTERN INTO R2
10031  041676  012704  000521                MOV     #521,R4 ;LOAD R4 WITH PAR VALUE
10032  041702  010467  130442                MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
10033  041706  011067  175446                MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
10034  041712  052767  000020  130576        BIS     #BIT4,SR3       ;SET UP FOR 22-BIT ADDRESSING
10035  041720  052767  000001  135644        BIS     #BIT0,SR0       ;TURN ON 'RELOCATION''
10036  041726  010211                    MOV     R2,(R1)         ;LOAD 125253 USING ADDER  (PAR4 + VIRT ADDR.)
10037  041730  005067  135636                CLR     SR0             ;TURN OFF MEMORY MGMT.
10038  041734  011003                    MOV     (R0),R3         ;READ 125253 BACK WITHOUT USING MEM. MGMT.
10039  041736  016710  175416                MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
10040  041742  020203                    CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
10041                                                            ;WRITTEN USING 'DEST-ONLY-RELOC.''?
10042  041744  001401                    BEQ     3$
10043  041746  104000                    EMT                     ;TEST LOCATION DID NOT HAVE PATTERN
10044                                                            ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
```

```
10045                                                   ;APPARENTLY PHYSICAL ADDR. WAS
10046                                                   ;FORMED WRONG BY ADDERS USING
10047                                                   ;THE VIRTUAL ADDR. AND KIPAR4
10048                                                   ;FOR TIGHTER SCOPE LOOP
10049                                                   ;REPLACE ERROR CALL WITH
10050                                                   ;'BR 2$" = 000742
10051  041750                           3$:
10052  041750  012700  062276          4$:     MOV     #62276,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
10053  041754  012701  107376                  MOV     #107376,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
10054  041760  012702  125254                  MOV     #125254,R2      ;LOAD TEST PATTERN INTO R2
10055  041764  012704  000527                  MOV     #527,R4 ;LOAD R4 WITH PAR VALUE
10056  041770  010467  130354                  MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
10057  041774  011067  175360                  MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
10058  042000  052767  000020  130510          BIS     #BIT4,SR3       ;SET UP FOR 22-BIT ADDRESSING
10059  042006  052767  000001  135556          BIS     #BIT0,SR0       ;TURN ON "RELOCATION"
10060  042014  010211                          MOV     R2,(R1)         ;LOAD 125254 USING ADDR.  (PAR4 + VIRT ADDR.)
10061  042016  005067  135550                  CLR     SR0             ;TURN OFF MEMORY MGMT.
10062  042022  011003                          MOV     (R0),R3         ;READ 125254 BACK WITHOUT USING MEM. MGMT.
10063  042024  016710  175330                  MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
10064  042030  020203                          CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
10065                                                                   ;WRITTEN USING "DEST-ONLY-RELOC."?
10066  042032  001401                          BEQ     5$
10067  042034  104000                          EMT                     ;TEST LOCATION DID NOT HAVE PATTERN
10068                                                                   ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
10069                                                                   ;APPARENTLY PHYSICAL ADDR. WAS
10070                                                                   ;FORMED WRONG BY ADDERS USING
10071                                                                   ;THE VIRTUAL ADDR. AND KIPAR4
10072                                                                   ;FOR TIGHTER SCOPE LOOP
10073                                                                   ;REPLACE ERROR CALL WITH
10074                                                                   ;'BR 4$" = 000742
10075  042036                           5$:
10076  042036  012700  062076          6$:     MOV     #62076,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
10077  042042  012701  104576                  MOV     #104576,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
10078  042046  012702  125255                  MOV     #125255,R2      ;LOAD TEST PATTERN INTO R2
10079  042052  012704  000553                  MOV     #553,R4 ;LOAD R4 WITH PAR VALUE
10080  042056  010467  130266                  MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
10081  042062  011067  175272                  MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
10082  042066  052767  000020  130422          BIS     #BIT4,SR3       ;SET UP FOR 22-BIT ADDRESSING
10083  042074  052767  000001  135470          BIS     #BIT0,SR0       ;TURN ON "RELOCATION"
10084  042102  010211                          MOV     R2,(R1)         ;LOAD 125255 USING ADDER  (PAR4 + VIRT ADDR.)
10085  042104  005067  135462                  CLR     SR0             ;TURN OFF MEMORY MGMT.
10086  042110  011003                          MOV     (R0),R3         ;READ 125255 BACK WITHOUT USING MEM. MGMT.
10087  042112  016710  175242                  MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
10088  042116  020203                          CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
10089                                                                   ;WRITTEN USING "DEST-ONLY-RELOC."?
10090  042120  001401                          BEQ     7$
10091  042122  104000                          EMT                     ;TEST LOCATION DID NOT HAVE PATTERN
10092                                                                   ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
10093                                                                   ;APPARENTLY PHYSICAL ADDR. WAS
10094                                                                   ;FORMED WRONG BY ADDERS USING
10095                                                                   ;THE VIRTUAL ADDR. AND KIPAR4
10096                                                                   ;FOR TIGHTER SCOPE LOOP
10097                                                                   ;REPLACE ERROR CALL WITH
10098                                                                   ;'BR 6$" = 000742
10099  042124                           7$:
10100  042124  012700  000000          8$:     MOV     #000000,R0      ;LOAD PHYSICAL ADDR. PBA INTO R0
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```
10101  042130  012701  111400                 MOV     #111400,R1      ;LOAD     UAL ADDR. VBA INTO R1
10102  042134  012702  125256                 MOV     #125256,R2      ;LOAD TEST PATTERN INTO R2
10103  042140  012704  177664                 MOV     #177664,R4      ;LOAD R4 WITH PAR VALUE
10104  042144  010467  130200                 MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
10105  042150  011067  175204                 MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
10106  042154  052767  000020  130334         BIS     #BIT4,SR3       ;SET UP FOR 22-BIT ADDRESSING
10107  042162  052767  000001  135402         BIS     #BIT0,SR0       ;TURN ON 'RELOCATION'
10108  042170  010211                         MOV     R2,(R1)         ;LOAD 125256 USING ADDER  (PAR4 + VIRT ADDR.)
10109  042172  005067  135374                 CLR     SR0             ;TURN OFF MEMORY MGMT.
10110  042176  011003                         MOV     (R0),R3         ;READ 125256 BACK WITHOUT USING MEM. MGMT.
10111  042200  016710  175154                 MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
10112  042204  020203                         CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
10113                                                                  ;WRITTEN USING 'DEST-ONLY-RELOC.'?
10114  042206  001401                         BEQ     9$
10115  042210  104000                         EMT                     ;TEST LOCATION DID NOT HAVE PATTERN
10116                                                                  ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
10117                                                                  ;APPARENTLY PHYSICAL ADDR. WAS
10118                                                                  ;FORMED WRONG BY ADDERS USING
10119                                                                  ;THE VIRTUAL ADDR. AND KIPAR4
10120                                                                  ;FOR TIGHTER SCOPE LOOP
10121                                                                  ;REPLACE ERROR CALL WITH
10122                                                                  ;'BR 8$' = 000742
10123  042212                          9$:
10124
10125                                  ;*****************************************************************************************
10126                                  ;TEST 375       READ AND WRITE WHILE IN RELOCATE MODE
10127                                  ;*****************************************************************************************
10128  042212                          TS375:
10129
10130  042212  005067  135560          1$:     CLR     PSW             ;START IN KERNEL MODE
10131  042216  012704  001377                  MOV     #1377,R4        ;LOAD R4 WITH VALUE FOR PAR4
10132  042222  012705  001400                  MOV     #1400,R5        ;LOAD R5 WITH VALUE FOR PAR5
10133  042226  010467  130116                  MOV     R4,KIPAR4       ;LOAD KERNEL PAR4
10134  042232  010567  130114                  MOV     R5,KIPAR5       ;LOAD KERNEL PAR5
10135  042236  012700  177640                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
10136  042242  005001                          CLR     R1              ;CLEAR R1
10137  042244  012702  000007                  MOV     #7,R2           ;LOAD LOOP COUNTER WITH A 7
10138  042250  010120          2$:     MOV     R1,(R0)+        ;MAP USER PAR'S TO PAGES 0-6 (4K EACH)
10139  042252  062701  000200                  ADD     #200,R1
10140  042256  077204                          SOB     R2,2$           ;LOOP UNTIL UIPAR0-UIPAR6 ARE LOADED
10141  042260  012710  177600                  MOV     #177600,(R0)    ;MAP USER PAR7 TO THE I/O PAGE
10142  042264  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
10143  042270  012701  077406                  MOV     #77406,R1       ;LOAD PDR DATA INTO R1
10144  042274  012702  000010                  MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
10145  042300  010120          3$:     MOV     R1,(R0)+        ;MAP ALL 8 PAGES 128 BLOCKS, UPWARD
10146  042302  077202                          SOB     R2,3$           ;       EXPANDABLE, READ/WRITE
10147  042304  012767  042550  135736          MOV     #8$,MMVEC       ;SET M. M. TRAP VECTOR TO 8$
10148  042312  052767  000020  130176          BIS     #BIT4,SR3       ;SET UP FOR 22-BIT ADDRESSING
10149  042320  012767  000001  135244          MOV     #BIT0,SR0       ;TURN ON MEMORY MANAGEMENT
10150  042326  105067  135256                  CLRB    UIPDR4          ;MAP USER SPACE NON-RESIDENT WHILE
10151  042332  105067  135254                  CLRB    UIPDR5          ;       TESTING KERNEL SPACE
10152  042336  010567  135306                  MOV     R5,UIPAR4       ;MAP USER PAR'S OPPOSITE OF KIPAR'S
10153  042342  010467  135304                  MOV     R4,UIPAR5
10154  042346  016767  135424  175004  4$:     MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
10155  042354  012700  100100                  MOV     #100100,R0      ;PUT VIRTUAL ADDR. THAT USES PAR4 IN R0
10156  042360  012701  120000                  MOV     #120000,R1      ;PUT VIRTUAL ADDR. THAT USES PAR5 IN R1
```

```
10157  042364  010010                  5$:     MOV     R0,(R0)         ;WRITE TO TEST LOC. USING PAR4
10158  042366  011102                          MOV     (R1),R2         ;READ THE SAME LOC., BUT USING PAR5
10159  042370  020002                          CMP     R0,R2           ;DID WE READ WHAT WE WROTE?
10160  042372  001401                          BEQ     6$
10161  042374  104000                          EMT                     ;READING LOC. USING PAR5 AND A VIRT.
10162                                                                  ;ADDR. DID NOT FIND DATA WRITTEN WHEN USING
10163                                                                  ;PAR4 AND VIRT. ADDRESS.
10164                                                                  ;FOR TIGHTER SCOPE LOOP
10165                                                                  ;REPLACE ERROR CALL WITH
10166                                                                  ;'BR 5$" = 000765
10167  042376  062700  000100          6$:     ADD     #100,R0         ;CHANGE VIRTUAL ADDRS. TO POINT TO NEXT BLOCK
10168  042402  062701  000100                  ADD     #100,R1
10169  042406  020127  127700                  CMP     R1,#127700      ;WERE BLOCKS FROM 60000-676000 ALL TRIED?
10170  042412  001364                          BNE     5$              ;BRANCH IF NO
10171  042414  032767  140000  135354          BIT     #140000,PSW     ;HAVE WE DONE TEST IN USER MODE YET?
10172  042422  001026                          BNE     7$              ;BRANCH IF YES
10173  042424  010467  135220                  MOV     R4,UIPAR4       ;LOAD USER PAR4
10174  042430  010567  135216                  MOV     R5,UIPAR5       ;LOAD USER PAR5
10175  042434  112767  000006  135146          MOVB    #6,UIPDR4       ;MAP USER SPACE R/W TO TEST IT
10176  042442  112767  000006  135142          MOVB    #6,UIPDR5
10177  042450  105067  127634                  CLRB    KIPDR4          ;MAP  KERNEL SPACE NON-RESIDENT WHILE
10178  042454  105067  127632                  CLRB    KIPDR5          ;       TESTING USER SPACE
10179  042460  010567  127664                  MOV     R5,KIPAR4       ;MAP KERNEL PAR'S OPPOSITE UIPAR'S
10180  042464  010467  127662                  MOV     R4,KIPAR5
10181  042470  012767  140000  135300          MOV     #140000,PSW     ;GO TO USER MODE
10182  042476  000723                          BR      4$              ;GO BACK AND READ/WRITE IN USER MODE
10183  042500  005067  135272          7$:     CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
10184  042504  012767  077406  127576          MOV     #77406,KIPDR4   ;REMAP KERNEL PAGES READ/WRITE
10185  042512  012767  077406  127572          MOV     #77406,KIPDR5
10186  042520  010567  127624                  MOV     R5,KIPAR4       ;MAP KERNEL  AND USER PAR'S 4 & 5
10187  042524  010567  127622                  MOV     R5,KIPAR5       ;  BACK TO 12-16K
10188  042530  010567  135114                  MOV     R5,UIPAR4
10189  042534  010567  135112                  MOV     R5,UIPAR5
10190  042540  012767  021356  135502          MOV     #T0250,MMVEC    ;RESTORE ADDR. OF NORMAL M.M. TRAP ROUTINE
10191  042546  000404                          BR      TS376           ;GET TO NEXT TEST
10192  042550  042767  160000  135014  8$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
10193  042556  104000                          EMT                     ;M.M. TRAP WHILE IN RELOCATE MODE -
10194                                                                  ;REFERENCED WRONG SET OF PDR'S
10195                                                                  ;FOR TIGHTER SCOPE LOOP
10196                                                                  ;REPLACE ERROR CALL WITH
10197                                                                  ;A "NOP" = 000240
10198
10199                                  ;*************************************************************************************
10200                                  ;TEST 376       W-BIT LOGIC TEST, KERNEL PDR'S
10201                                  ;*************************************************************************************
10202  042560                          TS376:
10203  042560                          1$:
10204  042560  004767  005262                  JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
10205  042564  012702  000004                  MOV     #4,R2           ;SET LOOP COUNTER TO 4
10206  042570  012700  172346                  MOV     #KIPAR3,R0      ;LOAD ADDRESS OF PAR3 INTO R0
10207  042574  012701  001400                  MOV     #1400,R1        ;LOAD "24-28K" PAR VALUE INTO R1
10208  042600  010120                  2$:     MOV     R1,(R0)+        ;MAP PARS 3-6 TO 12-16K
10209  042602  077202                          SOB     R2,2$           ;LOOP TIL ALL 4 OF THEM LOADED
10210  042604  012705  172300                  MOV     #KIPDR0,R5      ;LOAD ADDRESS OF FIRST PDR TO BE TESTED IN R5
10211  042610  012704  000010                  MOV     #10,R4          ;SET LOOP COUNTER TO 8
10212  042614  012703  017776                  MOV     #17776,R3       ;INITIALIZE VIRTUAL ADDRESS TO BE IN R3
```

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10213  0-2620  012700  172300          3$:     MOV     #KIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE SETUP IN R0
10214  042624  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
10215  042630  012701  077406                  MOV     #77406,R1       ;PUT 'W-BIT OFF DATA' INTO R1
10216  042634  010120                  4$:     MOV     R1,(R0)+        ;CLEAR ALL W-BITS BY WRITING TO ALL PDRS
10217  042636  077202                          SOB     R2,4$           ;LOOP UNTIL ALL OF THEM SETUP
10218  042640  011313                          MOV     (R3),(R3)       ;DO 'DATO' TO VIRTUAL ADDR.-SETTING A W-BIT
10219  042642  031527  000100                  BIT     (R5),#WBIT      ;DID THAT CAUSE W-BIT TO BE SET?
10220  042646  001001                          BNE     5$
10221  042650  104000                          EMT                     ;W-BIT DID NOT GET SET IN PDR
10222                                                                  ;FOR TIGHTER SCOPE LOOP
10223                                                                  ;REPLACE ERROR CALL WITH
10224                                                                  ;'BR 3$' = 000763
10225  042652  012702  000010          5$:     MOV     #10,R2          ;SET LOOP COUNTER TO 8
10226  042656  012700  172300                  MOV     #KIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE CHECKED IN R0
10227  042662  031027  000100          6$:     BIT     (R0),#WBIT      ;DID W-BIT IN OTHER PDRS REMAIN CLEAR?
10228  042666  001403                          BEQ     7$              ;BRANCH IF YES
10229  042670  020500                          CMP     R5,R0           ;IF W-BIT SET, THEN WAS IT PDR UNDER TEST?
10230  042672  001401                          BEQ     7$
10231  042674  104000                          EMT                     ;W-BIT GOT SET IN MORE THAN ONE PDR
10232                                                                  ;FOR TIGHTER SCOPE LOOP
10233                                                                  ;REPLACE ERROR CALL WITH
10234                                                                  ;'BR 3$' = 000750
10235  042676  062700  000002          7$:     ADD     #2,R0           ;POINT R0 TO NEXT PDR TO BE CHECKED
10236  042702  077211                          SOB     R2,6$           ;LOOP UNTIL ALL 8 CHECKED FOR CLEAR W-BIT
10237  042704  010115                          MOV     R1,(R5)         ;WRITE TO THE PDR TESTED TO CLEAR W-BIT
10238  042706  031527  000100                  BIT     (R5),#WBIT      ;DID WRITING PDR CLEAR THE W-BIT?
10239  042712  001401                          BEQ     8$
10240  042714  104000                          EMT                     ;W-BIT DID NOT CLEAR BY WRITING THE PDR
10241                                                                  ;FOR TIGHTER SCOPE LOOP
10242                                                                  ;REPLACE ERROR CALL WITH
10243                                                                  ;'BR 3$' = 000740
10244  042716  062705  000002          8$:     ADD     #2,R5           ;POINT R5 TO THE NEXT PDR TO BE TESTED
10245  042722  062703  020000                  ADD     #20000,R3       ;CHANGE VIRT. ADDR TO REF. NEXT PDR
10246  042726  077444                          SOB     R4,3$           ;LOOP BACK TO 3$ UNTIL ALL 8 PDR'S TESTED
10247  042730  004767  005146                  JSR     PC,TON          ;TURN T-BIT BACK ON FOR NEXT TEST
10248
10249                                  ;*****************************************************************************
10250                                  ;TEST 377       W-BIT LOGIC TEST, USER PDR'S
10251                                  ;*****************************************************************************
10252  042734                          TS377:
10253  042734  012767  140000  135034  1$:     MOV     #140000,PSW     ;GO TO USER MODE FOR THIS TEST
10254  042742  004767  005100                  JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
10255  042746  012702  000004                  MOV     #4,R2           ;SET LOOP COUNTER TO 4
10256  042752  012700  177646                  MOV     #UIPAR3,R0      ;LOAD ADDRESS OF PAR3 INTO R0
10257  042756  012701  001400                  MOV     #1400,R1        ;LOAD "24-28K" PAR VALUE INTO R1
10258  042762  010120                  2$:     MOV     R1,(R0)+        ;MAP PARS 3-6 TO 12-16K
10259  042764  077202                          SOB     R2,2$           ;LOOP TIL ALL 4 OF THEM LOADED
10260  042766  012705  177600                  MOV     #UIPDR0,R5      ;LOAD ADDRESS OF FIRST PDR TO BE TESTED IN R5
10261  042772  012704  000010                  MOV     #10,R4          ;SET LOOP COUNTER TO 8
10262  042776  012703  017776                  MOV     #17776,R3       ;INITIALIZE VIRTUAL ADDRESS TO BE IN R3
10263  043002  012700  177600          3$:     MOV     #UIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE SETUP IN R0
10264  043006  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
10265  043012  012701  077406                  MOV     #77406,R1       ;PUT 'W-BIT OFF DATA' INTO R1
10266  043016  010120                  4$:     MOV     R1,(R0)+        ;CLEAR ALL W-BITS BY WRITING TO ALL PDRS
10267  043020  077202                          SOB     R2,4$           ;LOOP UNTIL ALL OF THEM SETUP
10268  043022  011313                          MOV     (R3),(R3)       ;DO 'DATO' TO VIRTUAL ADDR.-SETTING A W-BIT
```

```
10269  043024  031527  000100          BIT     (R5),#WBIT      ;DID THAT CAUSE W-BIT TO BE SET?
10270  043030  001001                  BNE     5$
10271  043032  104000                  EMT                     ;W-BIT DID NOT GET SET IN PDR
10272                                                          ;FOR TIGHTER SCOPE LOOP
10273                                                          ;REPLACE ERROR CALL WITH
10274                                                          ;'BR 3$'' = 000763
10275  043034  012702  000010  5$:     MOV     #10,R2          ;SET LOOP COUNTER TO 8
10276  043040  012700  177600          MOV     #UIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE CHECKED IN R0
10277  043044  031027  000100  6$:     BIT     (R0),#WBIT      ;DID W-BIT IN OTHER PDRS REMAIN CLEAR?
10278  043050  001403                  BEQ     7$              ;BRANCH IF YES
10279  043052  020500                  CMP     R5,R0           ;IF W-BIT SET, THEN WAS IT PDR UNDER TEST?
10280  043054  001401                  BEQ     7$
10281  043056  104000                  EMT                     ;W-BIT GOT SET IN MORE THAN ONE PDR
10282                                                          ;FOR TIGHTER SCOPE LOOP
10283                                                          ;REPLACE ERROR CALL WITH
10284                                                          ;'BR 3$'' = 000750
10285  043060  062700  000002  7$:     ADD     #2,R0           ;POINT P0 TO NEXT PDR TO BE CHECKED
10286  043064  077211                  SOB     R2,6$           ;LOOP UNTIL ALL 8 CHECKED FOR CLEAR W-BIT
10287  043066  010115                  MOV     R1,(R5)         ;WRITE TO THE PDR TESTED TO CLEAR W-BIT
10288  043070  031527  000100          BIT     (R5),#WBIT      ;DID WRITING PDR CLEAR THE W-BIT?
10289  043074  001401                  BEQ     8$
10290  043076  104000                  EMT                     ;W-BIT DID NOT CLEAR BY WRITING THE PDR
10291                                                          ;FOR TIGHTER SCOPE LOOP
10292                                                          ;REPLACE ERROR CALL WITH
10293                                                          ;'BR 3$'' = 000740
10294  043100  062705  000002  8$:     ADD     #2,R5           ;POINT R5 TO THE NEXT PDR TO BE TESTED
10295  043104  062703  020000          ADD     #20000,R3       ;CHANGE VIRT. ADDR TO REF. NEXT PDR
10296  043110  077444                  SOB     R4,3$           ;LOOP BACK TO 3$ UNTIL ALL 8 PDR'S TESTED
10297  043112  004767  004764          JSR     PC,TON          ;TURN T-BIT BACK ON FOR NEXT TEST
10298  043116  005067  134654          CLR     PSW             ;BACK TO KERNEL MODE BEFORE LEAVING
10299
10300                                  ;******************************************************************************
10301                                  ;TEST 400       TEST 'W-BIT'' SPECIAL CASES
10302                                  ;******************************************************************************
10303  043122                          TS400:
10304
10305  043122  004767  004720  1$:     JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
10306  043126  012701  077406          MOV     #77406,R1       ;PUT 'W-BIT OFF'' VALUE FOR PDR IN R1
10307  043132  010167  127160  2$:     MOV     R1,KIPDR7       ;LOAD KERNEL PDR 7 TO CLEAR W-BIT
10308  043136  016700  134430          MOV     SR0,R0          ;READ PRESENT CONTENTS OF STATUS REG. 0
10309  043142  010067  134424          MOV     R0,SR0          ;WRITE PRESENT CONTENTS OF SR0 BACK TO ITSELF
10310  043146  016702  127144          MOV     KIPDR7,R2       ;READ CONTENTS OF KIPDR7 INTO R2
10311  043152  020102                  CMP     R1,R2           ;WAS W-BIT LEFT CLEARED?
10312  043154  001401                  BEQ     3$
10313  043156  104000                  EMT                     ;W-BIT IN KIPDR7 SET WHEN SR0 WAS WRITTEN TO
10314                                                          ;FOR TIGHTER SCOPE LOOP
10315                                                          ;REPLACE ERROR CALL WITH
10316                                                          ;'BR 2$'' = 000765
10317  043160  010167  127130  3$:     MOV     R1,KIPDR6       ;LOAD KERNEL PDR6 WITH 77406 TO CLEAR W-BIT
10318  043164  012767  043176  134612  MOV     #4$,ERRVEC      ;SET UP LOC. 4 TO 4$ FOR ODD ADDR. ABORT
10319  043172  005037  140000          CLR     @#140000        ;CAUSE TIMEOUT ABORT THRU LOC. 4
10320  043176  012706  001000  4$:     MOV     #KERSTK,KSP     ;RESTORE THE STACK POINTER
10321  043202  016702  127106          MOV     KIPDR6,R2       ;READ KIPDR6 INTO R2
10322  043206  052701  000100          BIS     #100,R1         ;R1-77506
10323  043212  020102                  CMP     R1,R2           ;WAS W-BIT SET?
10324  043214  001401                  BEQ     5$
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10325  043216  104000                          EMT                     ;W-BIT WAS NOT SET DURING A TIMEOUT ABORT
10326                                                                   ;FOR TIGHTER SCOPE LOOP
10327                                                                   ;REPLACE ERROR CALL WITH
10328                                                                   ;"BR 3$" = 000757
10329  043220  010167  127070                5$:     MOV     R1,KIPDR6       ;RESTORE KIPDR6 TO 77406
10330  043224  012767  001400  127122              MOV     #1400,KIPAR6    ;RESTORE KIPAR6 TO 1400
10331  043232  012767  021336  134544              MOV     #T04,ERRVEC     ;RESTORE NORMAL CPU TRAP ROUTINE TO LOC.4
10332  043240  004767  004636                      JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
10333
10334                                  ;*************************************************************************
10335                                  ;*
10336                                  ;*      THE NEXT THREE (3) TESTS CAUSE MEMORY MANAGEMENT ERRORS
10337                                  ;*      TO CHECK THE ABILITY OF STATUS REGISTER 0 TO RECORD KT
10338                                  ;*      ERRORS AND THE ABILITY OF STATUS REGISTER 2 TO LOCK UP THE
10339                                  ;*      VIRTUAL ADDR. OF THE INSTRUCTION THAT CAUSED THE ERROR.
10340                                  ;*      THE BITS OF SR2 ARE CHECKED AND BITS <15:13>, <6:5>, AND <3:0>
10341                                  ;*      ARE CHECKED IN SR0.  SO THE SR0 AND SR2 LOGIC AND THE
10342                                  ;*      KT ERROR LOGIC ARE CHECKED.
10343                                  ;*
10344                                  ;*************************************************************************
10345
10346                                  ;*************************************************************************
10347                                  ;TEST 401       NON-RESIDENT ABORT TEST (ACF=0&4)
10348                                  ;*************************************************************************
10349  043244                          TS401:
10350
10351  043244  012700  001400          1$:     MOV     #1400,R0        ;LOAD DATA FOR PAR'S INTO R0
10352  043250  010067  127072                  MOV     R0,KIPAR3       ;MAP KERNEL PAR'S 3&4 TO 24-28K
10353  043254  010067  127070                  MOV     R0,KIPAR4
10354  043260  010067  134362                  MOV     R0,UIPAR3       ;MAP USER PAR'S 3&4 TO 24-28K
10355  043264  010067  134360                  MOV     R0,UIPAR4
10356  043270  012767  077406  127010          MOV     #77406,KIPDR3   ;MAP KERNEL PDR 3  128 BLKS, READ-WRITE
10357  043276  012767  077406  134302          MOV     #77406,UIPDR3   ;MAP USER PDR 3  128 BLKS, READ-WRITE
10358  043304  012700  060000                  MOV     #60000,R0       ;LOAD VIRTUAL ADDR. TO REFERENCE PDR3 INTO R0
10359  043310  012701  100000                  MOV     #100000,R1      ;LOAD VIRTUAL ADDR. TO REFERENCE PDR4 INTO R1
10360  043314  012703  100011                  MOV     #100011,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ - N.R., KERNEL, PG.4
10361  043320  012702  077400                  MOV     #77400,R2       ;LOAD ACF=0 (NON-RESIDENT) PDR VALUE IN R2
10362  043324  012767  043360  134716  2$:     MOV     #5$,MMVEC       ;POINT MEM. MGMT. TRAP VECTOR TO 5$ BELOW
10363  043332  010267  126752                  MOV     R2,KIPDR4       ;LOAD ACF TEST VALUE INTO KIPDR4
10364  043336  010267  134246                  MOV     R2,UIPDR4       ;LOAD ACF TEST VALUE INTO UIPDR4
10365  043342  005010                  3$:     CLR     (R0)            ;CLEAR PHYS. LOC. 140000 USING PDR3
10366  043344  016767  134426  174006          MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
10367  043352  005211                  4$:     INC     (R1)            ;TRY TO REF. IT USING PDR4 - SHOULD TRAP TO 5$
10368  043354  001462                          BEQ     TS402
10369  043356  104000                          EMT                     ;MEM. MGMT. ABORT DID NOT OCCUR
10370                                                                   ;FOR TIGHTER SCOPE LOOP
10371                                                                   ;REPLACE ERROR CALL WITH
10372                                                                   ;"BR 3$" = 000772
10373  043360  062706  000004          5$:     ADD     #4,SP           ;RESTORE STACK POINTER
10374  043364  005710                          TST     (R0)            ;DID INSTRUCTION GET ABORTED & NOT EXECUTE
10375  043366  001401                          BEQ     6$
10376  043370  104000                          EMT                     ;INSTRUCTION WAS NOT ABORTED, LOC. GOT CHANGED
10377                                                                   ;FOR TIGHTER SCOPE LOOP
10378                                                                   ;REPLACE ERROR CALL WITH
10379                                                                   ;"BR 3$" = 000764
10380  043372  016767  134174  173752  6$:     MOV     SR0,WASSR0      ;READ STATUS REGISTER 0
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10381  043400  016767  134172  173746          MOV     SR2,WASSR2      ;READ STATUS REGISTER 2
10382  043406  020367  173740                  CMP     R3,WASSR0       ;DID SR0 REPORT NON-RESIDENT ERROR CORRECTLY?
10383  043412  001401                          BEQ     7$
10384  043414  104000                          EMT                     ;SR0 DID NOT REPORT NON-RES. ERROR CORRECTLY
10385                                                                   ;FOR TIGHTER SCOPE LOOP
10386                                                                   ;REPLACE ERROR CALL WITH
10387                                                                   ;'BR 3$'' = 000752
10388  043416  012704  043352          7$:     MOV     #4$,R4          ;LOAD R4 WITH WHAT SR2 SHOULD READ
10389  043422  020467  173726                  CMP     R4,WASSR2       ;DID SR2 LOCKUP RIGHT VIRTUAL ADDR. (=4$)?
10390  043426  001401                          BEQ     8$
10391  043430  104000                          EMT                     ;SR2 DID NOT LOCK VIRTUAL ADDR. OF NON-RES. ERROR
10392                                                                   ;FOR TIGHTER SCOPE LOOP
10393                                                                   ;REPLACE ERROR CALL WITH
10394                                                                   ;'BR 3$'' = 000744
10395  043432  042767  160000  134132  8$:     BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
10396  043440  032767  140000  173712          BIT     #140000,$TMP0   ;HAS ACF=0&4 BEEN TESTED IN USER YET
10397  043446  001006                          BNE     9$              ;BRANCH IF YES
10398  043450  012703  100151                  MOV     #100151,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ - N.R., USER, PG.4
10399  043454  012767  140000  134314          MOV     #140000,PSW     ;GO TO USER MODE
10400  043462  000720                          BR      2$              ;REPEAT TEST IN USER MODE
10401  043464  022702  077404          9$:     CMP     #77404,R2       ;HAS ACF=4 BEEN TESTED YET?
10402  043470  001407                          BEQ     10$             ;BRANCH IF YES
10403  043472  012702  077404                  MOV     #77404,R2       ;THEN LOAD ACF=4 (NON-RES) PDR VALUE IN R2
10404  043476  012703  100011                  MOV     #100011,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ-N.R.,KERNEL,PG. 4
10405  043502  005067  134270                  CLR     PSW             ;GO BACK TO KERNEL MODE
10406  043506  000706                          BR      2$              ;GO BACK & TEST ACF=4 IN SAME MODE
10407  043510  005067  134262          10$:    CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
10408  043514  012767  021356  134526          MOV     #T0250,MMVEC    ;RESTORE ADDRESS OF NORMAL MEMORY
10409                                                                   ;MANAGEMENT ERROR ROUTINE TO MMVEC
10410
10411                          ;*****************************************************************************************
10412                          ;TEST 402       READ-ONLY ABORT TEST (ACF=2)
10413                          ;*****************************************************************************************
10414  043522                  TS402:
10415  043522                  1$:                                     ;KERNEL & USER PAR'S 3 & 4 AND PDR 3
10416                                                                  ;ARE SETUP FROM LAST TEST
10417  043522  012700  060000          MOV     #60000,R0               ;LOAD VIRTUAL ADDR. TO REFERENCE PDR3 INTO R0
10418  043526  012701  100000          MOV     #100000,R1              ;LOAD VIRTUAL ADDR. TO REFERENCE PDR4 INTO R1
10419  043532  012703  020011          MOV     #20011,R3               ;LOAD R3 WITH WHAT SR0 SHOULD READ - R/O, KERNEL, PG.4
10420  043536  012702  077402          MOV     #77402,R2               ;LOAD ACF=2 (READ-ONLY) PDR VALUE IN R2
10421  043542  012767  043574  134500  2$:     MOV     #5$,MMVEC       ;POINT MEM. MGMT. TRAP VECTOR TO 5$ BELOW
10422  043550  010267  126534          MOV     R2,KIPDR4               ;LOAD ACF=2 INTO KIPDR4
10423  043554  010267  134030          MOV     R2,UIPDR4               ;LOAD ACF=2 INTO UIPDR4
10424  043560  005010                  3$:     CLR     (R0)            ;CLEAR PHYS. LOC. 140000 USING PDR3
10425  043562  016767  134210  173570          MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
10426  043570  005211                  4$:     INC     (R1)            ;TRY TO WRITE USING PDR4 - SHOULD TRAP TO 5$
10427  043572  104000                          EMT                     ;MEM. MGMT. ABORT DID NOT OCCUR
10428                                                                  ;FOR TIGHTER SCOPE LOOP
10429                                                                  ;REPLACE ERROR CALL WITH
10430                                                                  ;'BR 3$'' = 000772
10431  043574  062706  000004          5$:     ADD     #4,SP           ;RESTORE STACK POINTER
10432  043600  005710                          TST     (R0)            ;DID INSTRUCTION GET ABORTED & NOT EXECUTE
10433  043602  001401                          BEQ     6$
10434  043604  104000                          EMT                     ;INSTRUCTION WAS NOT ABORTED, LOC. GOT CHANGED
10435                                                                  ;FOR TIGHTER SCOPE LOOP
10436                                                                  ;REPLACE ERROR CALL WITH
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10437                                                                   ;'BR 3$'' = 000764
10438  043606  016767  133760  173536  6$:     MOV     SR0,WASSR0      ;READ STATUS REG. 0
10439  043614  016767  133756  173532          MOV     SR2,WASSR2      ;READ STATUS REG. 2
10440  043622  020367  173524                  CMP     R3,WASSR0       ;DID SR0 REPORT READ-ONLY ERROR CORRECTLY?
10441  043626  001401                          BEQ     7$
10442  043630  104000                          EMT                     ;SR0 DID NOT REPORT R/O ERROR CORRECTLY
10443                                                                   ;FOR TIGHTER SCOPE LOOP
10444                                                                   ;REPLACE ERROR CALL WITH
10445                                                                   ;'BR 3$'' = 000752
10446  043632  012704  043570          7$:     MOV     #4$,R4          ;LOAD R4 WITH WHAT SR2 SHOULD READ
10447  043636  020467  173512                  CMP     R4,WASSR2       ;DID SR2 LOCKUP RIGHT VIRTUAL ADDR. (=4$)?
10448  043642  001401                          BEQ     8$
10449  043644  104000                          EMT                     ;SR2 DID NOT LOCKUP VIRTUAL ADDR. OF R/O ERROR
10450                                                                   ;FOR TIGHTER SCOPE LOOP
10451                                                                   ;REPLACE ERROR CALL WITH
10452                                                                   ;'BR 3$'' = 000744
10453  043646  042767  160000  133716  8$:     BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
10454  043654  032767  140000  173476          BIT     #140000,$TMP0   ;HAS ACF=2 BEEN TESTED IN USER MODE?
10455  043662  001006                          BNE     9$              ;BRANCH IF YES
10456  043664  012703  020151                  MOV     #20151,R3       ;LOAD R3 WITH WHAT SR0 SHOULD READ-R/O, USER, PG.4
10457  043670  012767  140000  134100          MOV     #140000,PSW     ;GO TO USER MODE
10458  043676  000721                          BR      2$              ;REPEAT TEST IN USER MODE
10459  043700  005067  134072          9$:     CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
10460  043704  012767  021356  134336          MOV     #T0250,MMVEC    ;RESTORE ADDRESS OF NORMAL MEMORY
10461                                                                   ;MANAGEMENT ERROR ROUTINE TO MMVEC.
10462
10463
10464
10465                                   ;NOTE:  MACRO MSG31A WAS DELETED AS IT DIDN'T APPLY TO F11.
10466
10467
10468
10469
10470
10471
10472
10473
10474  ;*****************************************************************************************
10475  ;*
10476  ;*      THE NEXT TWO (2) TESTS WILL BE CHECKING THE PAGE LENGTH
10477  ;*      COMPARATORS AND SOME MORE OF THE KT ERROR DETECTION
10478  ;*      AND STATUS LOGIC.  THE PAGE LENGTH FIELD (PLF) IN KERNEL
10479  ;*      PDR 4 IS VARIED AND FOR EVERY PLF, THREE (3) VIRTUAL
10480  ;*      ADDRESSES ARE READ.  WHILE USING BOTH UPWARD & DOWNWARD PAGE
10481  ;*      EXPANSION, ONE OF THOSE THREE VIRTUAL ADDRESSES WILL CAUSE A
10482  ;*      'PAGE LENGTH ABORT'' WHILE THE OTHER TWO WON'T.
10483  ;*
10484  ;*      STATUS REGISTER 0 & 2 ARE CHECKED WHEN THE PAGE LENGTH
10485  ;*      ABORT DOES OCCUR TO SEE THAT THE ABORT IS REPORTED AND THAT
10486  ;*      THE VIRTUAL ADDRESS OF THE INSTRUCTION THAT CAUSED THE ABORT
10487  ;*      IS LOCKED UP.
10488  ;*
10489  ;*****************************************************************************************
10490
10491
10492
```

```
10493                                   ;*****************************************************************************
10494                                   ;TEST 403       PAGE LENGTH FAULTS-UPWARD EXPANSION
10495                                   ;*****************************************************************************
10496  043712                           TS403:
10497  043712  012767  077406  126366   1$:     MOV     #77406,KIPDR3   ;MAKE SURE PDR3 IS DESCRIBED AS R/W
10498  043720  012767  077406  126364           MOV     #77406,KIPDR5   ;MAKE SURE PDR5 IS DESCRIBED AS R/W
10499  043726  012700  044126                   MOV     #DALTB1,R0      ;DAL TABLE FOR VIRTUAL ADDR'S. TO SELECT PDR4.
10500  043732  012704  044144                   MOV     #PDRTB1,R4      ;PDR TAB.E FOR PDR4 (COINCIDES WITH DAL TABLE).
10501  043736  012701  000006                   MOV     #6,R1           ;SET UP LOOP COUNTER.
10502  043742  012767  044104  134300           MOV     #9$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR UNEXPECTED ABORTS
10503  043750  012706  001000                   MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
10504
10505                                   ;TEST NON-ABORT CASES (VBA < OR = PLF)
10506  043754  012467  126330           2$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGTH VALUE
10507  043760  005730                           TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA < OR = PLF)
10508                                           ;NO ABORT SHOULD OCCUR!!!
10509  043762  077104                           SOB     R1,2$           ;DONE?...NO- TEST NEXT COMBINATION OF DAL & PDR.
10510
10511                                   ;TEST ABORT CASES (VBA > PLF)
10512  043764  012701  000005           3$:     MOV     #5,R1           ;SET UP LOOP COUNTER.
10513  043770  012700  044162                   MOV     #DALTB2,R0      ;DAL TABLE
10514  043774  012704  044176                   MOV     #PDRTB2,R4      ;PDR TABLE
10515  044000  012767  044020  134242           MOV     #6$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR EXPECTED ABORT
10516
10517  044006  012467  126276           4$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGHT VALUE
10518  044012  005730                   5$:     TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA > PLF - ABORT TO 6$)
10519  044014  001476                           BEQ     TS404
10520  044016  104000                           EMT                     ;EXPECTED PAGE LENGTH ABORT DID NOT OCCUR
10521                                           ;FOR TIGHTER SCOPE LOOP
10522                                           ;REPLACE ERROR CALL WITH
10523                                           ;'BR 5$" = 000776
10524  044020  012706  001000           6$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER FOLLOWING ABORT
10525  044024  016767  133542  173320           MOV     SR0,WASSR0      ;READ M.M. STATUS REG. 0
10526  044032  016767  133540  173314           MOV     SR2,WASSR2      ;READ M.M. STATUS REG. 2
10527  044040  012702  040011                   MOV     #40011,R2       ;PUT EXPECTED SR0 CONTENTS IN R2
10528  044044  020267  173302                   CMP     R2,WASSR0       ;DID SR0 REPORT PG. LENGTH ABORT, PAGE 4, KERNEL?
10529  044050  001401                           BEQ     7$
10530  044052  104000                           EMT                     ;SR0 DID NOT REPORT PG. LENGTH ABORT CORRECTLY
10531                                           ;FOR TIGHTER SCOPE LOOP
10532                                           ;REPLACE ERROR CALL WITH
10533                                           ;'BR 5$" = 000757
10534  044054  012703  044012           7$:     MOV     #5$,R3          ;PUT EXPECTED SR2 CONTENTS IN R3
10535  044060  020367  173270                   CMP     R3,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR. OF ABORTED INSTRUCTION?
10536  044064  001401                           BEQ     8$
10537  044066  104000                           EMT                     ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ABORT CORRECTLY
10538                                           ;FOR TIGHTER SCOPE LOOP
10539                                           ;REPLACE ERROR CALL WITH
10540                                           ;'BR 5$" = 000751
10541  044070  042767  160000  133474   8$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
10542  044076  077135                           SOB     R1,4$           ;DONE?..NO -- GET NEXT DAL & PDR PAIR
10543  044100  000167  000010                   JMP     10$             ;YES...
10544  044104  042767  160000  133460   9$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
10545  044112  104000                           EMT                     ;GOT PG. LENGTH ABORT BEFORE IT WAS EXPECTED
10546                                           ;FOR TIGHTER SCOPE LOOP
10547                                           ;REPLACE ERROR CALL WITH
10548                                           ;A "NOP" = 240
```

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10549
10550  044114  012767  021356  134126  10$:    MOV     #T0250,MMVEC    ;RESTORE NORMAL M.M. TRAP HANDLER
10551                                           ;ADDRESS TO M.M. TRAP VECTOR
10552  044122  000167  000064                  JMP     TS404           ;GET TO NEXT TEST
10553
10554                                  ;DAL TABLE FOR UPWARD EXPANSION (NON-ABORT CASES)
10555  044126  100000                  DALTB1: 100000
10556  044130  106100                          106100
10557  044132  102300                          102300
10558  044134  102500                          102500
10559  044136  113700                          113700
10560  044140  104600                          104600
10561  044142  117700                          117700
10562
10563                                  ;PDR TABLE FOR KPDR4 (NON-ABORT CASES)
10564  044144  000006                  PDRTB1: 000006
10565  044146  052006                          052006
10566  044150  045006                          045006
10567  044152  052006                          052006
10568  044154  074406                          074406
10569  044156  025006                          025006
10570  044160  077406                          077406
10571
10572                                  ;DAL TABLE (ABORT CASES)
10573  044162  100100                  DALTB2: 100100
10574  044164  110100                          110100
10575  044166  116600                          116600
10576  044170  112700                          112700
10577  044172  117000                          117000
10578  044174  117700                          117700
10579
10580                                  ;PDR TABLE (ABORT CASES)
10581  044176  000006                  PDRTB2: 000006
10582  044200  030406                          030406
10583  044202  046406                          046406
10584  044204  042006                          042006
10585  044206  073406                          073406
10586  044210  077006                          077006
10587
10588
10589                                  ;*****************************************************************************
10590                                  ;TEST 404       PAGE LENGTH FAULTS-DOWNWARD EXPANSION
10591                                  ;*****************************************************************************
10592  044212                          TS404:
10593  044212  012700  044412          1$:     MOV     #DALTB3,R0      ;DAL TABLE FOR VIRTUAL ADDR'S. TO SELECT PDR4.
10594  044216  012704  044430                  MOV     #PDRTB3,R4      ;PDR TABLE FOR PDR4 (COINCIDES WITH DAL TABLE).
10595  044222  012701  000006                  MOV     #6,R1           ;SET UP LOOP COUNTER.
10596  044226  012767  044370  134014          MOV     #9$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR UNEXPECTED ABORTS
10597  044234  012706  001000                  MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
10598
10599                                  ;TEST NON-ABORT CASES (VBA > OR = PLF)
10600  044240  012467  126044          2$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGTH VALUE
10601  044244  005730                          TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA > OR = PLF)
10602                                           ;NO ABORT SHOULD OCCUR!!!
10603  044246  077104                          SOB     R1,2$           ;DONE?...NO- TEST NEXT COMBINATION OF DAL & PDR.
10604
```

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10605                                          ;TEST ABORT CASES (VBA < PLF)
10606  044250  012701  000005          3$:     MOV     #5,R1           ;SET UP LOOP COUNTER.
10607  044254  012700  044446                  MOV     #DALTB4,R0      ;DAL TABLE
10608  044260  012704  044462                  MOV     #PDRTB4,R4      ;PDR TABLE
10609  044264  012767  044304  133756          MOV     #6$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR EXPECTED ABORT
10610
10611  044272  012467  126012          4$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGHT VALUE
10612  044276  005730                  5$:     TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA < PLF - ABORT TO 6$)
10613  044300  001476                          BEQ     TS405
10614  044302  104000                          EMT                     ;EXPECTED PAGE LENGTH ABORT DID NOT OCCUR
10615                                                                  ;FOR TIGHTER SCOPE LOOP
10616                                                                  ;REPLACE ERROR CALL WITH
10617                                                                  ;'BR 5$'' = 000776
10618  044304  012706  001000          6$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER FOLLOWING ABORT
10619  044310  016767  133256  173034          MOV     SR0,WASSR0      ;READ M.M. STATUS REG. 0
10620  044316  016767  133254  173030          MOV     SR2,WASSR2      ;READ M.M. STATUS REG. 2
10621  044324  012702  040011                  MOV     #40011,R2       ;PUT EXPECTED SR0 CONTENTS IN R2
10622  044330  020267  173016                  CMP     R2,WASSR0       ;DID SR0 REPORT PG. LENGTH ABORT, PAGE 4, KERNEL?
10623  044334  001401                          BEQ     7$
10624  044336  104000                          EMT                     ;SR0 DID NOT REPORT PG. LENGTH ABORT CORRECTLY
10625                                                                  ;FOR TIGHTER SCOPE LOOP
10626                                                                  ;REPLACE ERROR CALL WITH
10627                                                                  ;'BR 5$'' = 000757
10628  044340  012703  044276          7$:     MOV     #5$,R3          ;PUT EXPECTED SR2 CONTENTS IN R3
10629  044344  020367  173004                  CMP     R3,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR. OF ABORTED INSTRUCTION?
10630  044350  001401                          BEQ     8$
10631  044352  104000                          EMT                     ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ABORT CORRECTLY
10632                                                                  ;FOR TIGHTER SCOPE LOOP
10633                                                                  ;REPLACE ERROR CALL WITH
10634                                                                  ;'BR 5$'' = 000751
10635  044354  042767  160000  133210  8$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
10636  044362  077135                          SOB     R1,4$           ;DONE?..NO - GET NEXT DAL & PDR PAIR
10637  044364  000167  000010                  JMP     10$             ;YES...
10638  044370  042767  160000  133174  9$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
10639  044376  104000                          EMT                     ;GOT PG. LENGTH ABORT BEFORE IT WAS EXPECTED
10640                                                                  ;FOR TIGHTER SCOPE LOOP
10641                                                                  ;REPLACE ERROR CALL WITH
10642                                                                  ;A 'NOP'' = 000240
10643
10644  044400  012767  021356  133642  10$:     MOV     #T0250,MMVEC    ;RESTORE NORMAL M.M. TRAP HANDLER
10645                                                                  ;ADDRESS TO M.M. TRAP VECTOR
10646  044406  000167  000064                  JMP     TS405           ;GET TO NEXT TEST
10647
10648                                  ;DAL TABLE FOR DOWNWARD EXPANSION (NON-ABORT CASES)
10649  044412  117700                  DALTB3: 117700
10650  044414  111600                          111600
10651  044416  115400                          115400
10652  044420  115200                          115200
10653  044422  104000                          104000
10654  044424  113100                          113100
10655  044426  100000                          100000
10656
10657                                  ;PDR TABLE (NON-ABORT CASES)
10658  044430  077416                  PDRTB3: 77416
10659  044432  025416                          25416
10660  044434  032416                          32416
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10661   044436  025416                          25416
10662   044440  003016                          03016
10663   044442  052416                          52416
10664   044444  000016                          00016
10665
10666                                           ;DAL TABLE (ABORT CASES)
10667   044446  117600                  DALTB4: 117600
10668   044450  107600                          107600
10669   044452  101100                          101100
10670   044454  105000                          105000
10671   044456  100700                          100700
10672   044460  100000                          100000
10673
10674                                           ;PDR TABLE (ABORT CASES)
10675   044462  077416                  PDRTB4: 77416
10676   044464  047016                          47016
10677   044466  031016                          31016
10678   044470  035416                          35416
10679   044472  004016                          04016
10680   044474  000416                          00416
10681
10682
10683
10684                                           ;*****************************************************************************
10685                                           ;TEST 405       SR2 BIT TEST
10686                                           ;*****************************************************************************
10687   044476                          TS405:
10688   044476  012767  001400  125642  1$:     MOV     #1400,KIPAR3    ;BE SURE PAR3 IS MAPPED TO 24-28K
10689   044504  012767  001400  125636          MOV     #1400,KIPAR4    ;BE SURE PAR4 IS MAPPED TO 24-28K
10690   044512  012767  077406  125566          MOV     #77406,KIPDR3   ;MAP PAGE 3  128 BLOCKS, R/W
10691   044520  012767  077402  125562          MOV     #77402,KIPDR4   ;MAP PAGE 4  128 BLOCKS, READ-ONLY
10692   044526  012700  060002                  MOV     #60002,R0       ;LOAD R0 WITH VIRTUAL ADDR. WHICH USES PDR3
10693   044532  012701  100002                  MOV     #100002,R1      ;LOAD R1 WITH VIRTUAL ADDR. WHICH USES PDR4
10694   044536  012767  044564  133504          MOV     #3$,MMVEC       ;SET M.M. TRAP VECTOR TO 3$
10695   044544  012720  010727          2$:     MOV     #010727,(R0)+   ;LOAD 'MOV PC,(PC)+'' INSTRUCTION AT ADDR.
10696   044550  005020                  CLR     (R0)+           ;       REACHED THRU PDR/PAR 4.
10697   044552  012720  000137                  MOV     #000137,(R0)+   ;LOAD ''JMP @#3$'' INSTRUCTION AT VIRT. ADDR.
10698   044556  012710  044564                  MOV     #3$,(R0)        ;       IN CASE R/O VIOL. DOES NOT ABORT
10699   044562  010107                  MOV     R1,PC           ;TRANSFER PROGRAM EXECUTION TO ''PAGE 4 INSTRUCTIONS''
10700   044564  012706  001000          3$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER
10701   044570  016767  133002  172556          MOV     SR2,WASSR2      ;READ CONTENTS OF STATUS REG 2
10702   044576  020167  172552                  CMP     R1,WASSR2       ;WAS ADDR. OF ''RELOCATED - R/O ABORT'' LOCKED UP?
10703   044602  001401                  BEQ     4$
10704   044604  104000                  EMT                             ;SR2 DID NOT LOCK UP VIRTUAL ADDR. OF R/O VIOL.
10705                                                                   ;FOR TIGHTER SCOPE LOOP
10706                                                                   ;REPLACE ERROR CALL WITH
10707                                                                   ;''BR 2$'' = 000757
10708   044606  042767  160000  132756  4$:     BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
10709   044614  060101                  ADD     R1,R1           ;SETUP TO FORM NEXT VIRTUAL ADDRESS
10710   044616  010100                  MOV     R1,R0           ;SETUP R0 TO FORM NEXT VIRT. ADDR. TO LOAD
10711   044620  052701  100000                  BIS     #100000,R1      ;FORM VIRTUAL ADDR. THAT SHOULD BE LOCKED UP NEXT
10712   044624  052700  060000                  BIS     #60000,R0       ;POINT R0 TO NEXT VIRT. ADDR. TO LOAD
10713   044630  020127  110000                  CMP     R1,#110000      ;HAVE ALL VBA'S 100000-110000 BEEN TESTED?
10714   044634  101743                  BLOS    2$              ;BRANCH IF NO
10715
10716   044636  012767  077406  125444          MOV     #77406,KIPDR4   ;RESTORE PDR4 TO R/W ACCESS
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10717  044644  012767  021356  133376          MOV     #T0250,MMVEC    ;RESTORE ADDRESS OF NORMAL M.M.
10718                                                                   ;TRAP HANDLER TO M.M. VECTOR
10719
10720
10721                                  ;*************************************************************************************
10722                                  ;TEST 406       MORE CHECKS OF SR0 & SR2
10723                                  ;*************************************************************************************
10724  044652                          TS406:
10725  044652  012767  001400  125472  1$:     MOV     #1400,KIPAR5    ;MAP KERNEL PAGE 5 TO 24-28K
10726  044660  012767  000406  125422          MOV     #406,KIPDR4     ;SETUP PDR4 FOR PAGE LENGTH ABORT
10727  044666  012767  077402  125416          MOV     #77402,KIPDR5   ;SETUP PDR5 FOR R/O ABORT
10728  044674  016767  132676  172452  2$:     MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING
10729  044702  012701  044674                  MOV     #2$,R1          ;PUT EXPECTED VIRTUAL PC IN R1
10730  044706  020167  172442                  CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 2$?
10731  044712  001401                          BEQ     4$
10732  044714  104000                          EMT                     ;SR2 NOT TRACKING CORRECTLY
10733                                                                   ;FOR TIGHTER SCOPE LOOP
10734                                                                   ;REPLACE ERROR CALL WITH
10735                                                                   ;'BR 2$' = 000767
10736  044716  016767  132654  172430  4$:     MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING
10737  044724  012701  044716                  MOV     #4$,R1          ;PUT EXPECTED VIRTUAL PC IN R1
10738  044730  020167  172420                  CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 4$
10739  044734  001401                          BEQ     6$
10740  044736  104000                          EMT                     ;SR2 NOT TRACKING CORRECTLY
10741                                                                   ;FOR TIGHTER SCOPE LOOP
10742                                                                   ;REPLACE ERROR CALL WITH
10743                                                                   ;'BR 4$' = 000767
10744  044740  012767  044756  133302  6$:     MOV     #7$,MMVEC       ;PUT ADDRESS OF 7$ IN M.M. TRAP VECTOR
10745  044746  005067  172410                  CLR     $TMP1           ;CLEAR ERROR INDICATOR
10746  044752  005237  100500                  INC     @#100500        ;CAUSE PAGE LENGTH ABORT - TRAP TO 7$
10747  044756  012706  001000          7$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER ABORT
10748  044762  016767  132604  172370          MOV     SR0,$TMP0       ;SAVE SR0'S INFORMATION ON PG. LGTH. ABORT
10749  044770  016767  132602  172366          MOV     SR2,$TMP2       ;SAVE SR2'S INFORMATION ON PG. LGTH. ABORT
10750  044776  012767  045010  133244          MOV     #8$,MMVEC       ;PUT ADDRESS OF 8$ IN M.M. TRAP VECTOR
10751  045004  005237  120000                  INC     @#120000        ;CAUSE R/O ABORT - TRAP TO 8$
10752  045010  012706  001000          8$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER ABORT
10753  045014  016767  132552  172330          MOV     SR0,WASSR0      ;READ SR0 FOLLWOING SECOND KT ABORT
10754  045022  016767  132550  172324          MOV     SR2,WASSR2      ;READ SR2 FOLLOWING SECOND KT ABORT
10755  045030  026767  172324  172314          CMP     $TMP0,WASSR0    ;IS SR0 STILL HOLDING INFO ON FIRST ABORT?
10756  045036  001402                          BEQ     9$              ;BRANCH IF YES
10757  045040  005267  172316                  INC     $TMP1           ;SET ERROR INDICATOR
10758  045044  026767  172314  172302  9$:     CMP     $TMP2,WASSR2    ;DOES SR2 STILL HOLD PC OF FIRST ABORT?
10759  045052  001402                          BEQ     10$             ;BRANCH IF YES
10760  045054  005267  172302                  INC     $TMP1           ;SET ERROR INDICATOR
10761  045060  005767  172276          10$:    TST     $TMP1           ;WERE SR0 OR SR2 CHANGED BY A SECOND ABORT?
10762  045064  001401                          BEQ     11$
10763  045066  104000                          EMT                     ;ONE OF STATUS REGS. CHANGED BY SECOND ABORT
10764                                                                   ;FOR TIGHTER SCOPE LOOP
10765                                                                   ;REPLACE ERROR CALL WITH
10766                                                                   ;'BR 6$' = 000726
10767  045070  005067  172266          11$:    CLR     $TMP1           ;CLEAR ERROR INDICATOR
10770  045074  000005                          RESET                   ;EXECUTE A RESET, APPLYING AN ''INIT''
10769  045076  005067  132470                  CLR     SR0
10770  045102  016767  132464  172242          MOV     SR0,WASSR0      ;READ SR0
10771  045110  005767  172236                  TST     WASSR0          ;WAS SR0 CLEARED BY THE RESET?
10772  045114  001402                          BEQ     12$             ;BRANCH IF YES
```

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10773  045116  005267  172240                    INC     $TMP1           ;SR0 NOT CLEARED BY A RESET
10774  045122  016767  132450  172224  12$:      MOV     SR2,WASSR2      ;READ SR2
10775  045130  022767  045122  172216            CMP     #12$,WASSR2     ;WAS SR2 UNLOCKED BY A RESET?
10776  045136  001402                            BEQ     13$             ;BRANCH IF YES
10777  045140  005267  172216                    INC     $TMP1           ;SR2 NOT UNLOCKED BY A RESET
10778  045144  005767  172212          13$:      TST     $TMP1           ;WERE SR0 & SR2 BOTH "RESET" BY A RESET?
10779  045150  001401                            BEQ     14$
10780  045152  104000                            EMT                     ;SR0 OR SR2 NOT "RESET" BY A RESET
10781                                                                     ;FOR TIGHTER SCOPE LOOP
10782                                                                     ;REPLACE ERROR CALL WITH
10783                                                                     ;"BR 6$" = 000676
10784  045154  012767  000001  132410  14$:      MOV     #1,SR0          ;TURN MEMORY MANAGEMENT BACK ON
10785  045162  016767  132410  172164  15$:      MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING AGAIN
10786  045170  012701  045162                    MOV     #15$,R1         ;PUT EXPECTED VIRTUAL PC IN R1
10787  045174  020167  172154                    CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 15$
10788  045200  001401                            BEQ     16$
10789  045202  104000                            EMT                     ;SR2 NOT TRACKING CORRECTLY
10790                                                                     ;FOR TIGHTER SCOPE LOOP
10791                                                                     ;REPLACE ERROR CALL WITH
10792                                                                     ;"BR 6$" = 000663
10793  045204  012767  077406  125076  16$:      MOV     #77406,KIPDR4   ;RESET PDR4 TO 128 BLKS, R/W
10794  045212  012767  077406  125072            MOV     #77406,KIPDR5   ;RESET PDR5 TO 128 BLKS, R/W
10795  045220  012767  021356  133022            MOV     #T0250,MMVEC    ;RESTORE ADDRESS OF NORMAL MEMORY
10796                                                                     ;MANAGEMENT TRAP ROUTINE TO M.M. VECTOR
10797
10798
10799                          ;*********************************************************************************
10800                          ;TEST 407       USER ABORT PICKS UP KERNEL SPACE VECTOR
10801                          ;*********************************************************************************
10802  045226                  TS407:
10803  045226  004767  002614          1$:       JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
10804  045232  005067  132540          2$:       CLR     PSW             ;GO TO KERNEL MODE
10805  045236  012706  001000                    MOV     #KERSTK,KSP     ;SETUP KERNEL STACK PTR.
10806  045242  012767  001400  132370            MOV     #1400,UIPAR0    ;MAP USER PAGE 0 TO 24K
10807  045250  012737  045320  000004            MOV     #4$,a#4         ;LOAD KERNEL VECTOR 4 (LOC.4) WITH 4$
10808  045256  012737  000340  000006            MOV     #340,a#6        ;LOAD VECTOR+2 WITH NEW PSW
10809  045264  012767  140000  132504            MOV     #140000,PSW     ;GO TO USER MODE
10810  045272  012706  000600                    MOV     #USESTK,USP     ;SETUP USER STACK PTR.
10811  045276  012737  045316  000004            MOV     #3$,a#4         ;LOAD USER VECTOR 4 (LOC. 60004) WITH 3$
10812  045304  012737  000340  000006            MOV     #340,a#6        ;LOAD VECTOR+2 WITH NEW PSW
10813  045312  005767  112462                    TST     160000          ;CAUSE TIMEOUT ERROR TRAP TO "4"
10814                                                                     ;SHOULD PICK UP NEW PC=4$ FROM KERNEL
10815                                                                     ;LOC. 4, NOT PC=3$ FROM USER LOC. 4 (=60004)
10816  045316                  3$:
10817  045316  104000                            EMT                     ;DID NOT TRAP THRU KERNEL SPACE
10818                                                                     ;FOR TIGHTER SCOPE LOOP
10819                                                                     ;REPLACE ERROR CALL WITH
10820                                                                     ;"BR 2$" = 000740
10821  045320  005067  132452          4$:       CLR     PSW             ;BE SURE BACK IN KERNEL MODE
10822  045324  012706  001000                    MOV     #KERSTK,KSP     ;RESTORE KERNEL S.P. IN CASE IT CHANGED
10823  045330  005067  132304                    CLR     UIPAR0          ;REMAP USER PAGE 0 TO 0-4K
10824  045334  012767  140000  132434            MOV     #140000,PSW     ;GO TO USER MODE
10825  045342  012706  000600                    MOV     #USESTK,USP     ;RESTORE USER STACK POINTER
10826  045346  005067  132424                    CLR     PSW             ;GO BACK TO KERNEL MODE
10827  045352  012737  021336  000004            MOV     #T04,a#4        ;RESTORE ADDR. OF NORMAL CPU TRAP HANDLER TO 4
10828  045360  004767  002516                    JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
```

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10829
10830                                   ;*****************************************************************************
10831                                   ;TEST 410       RTI IN USER MODE DOES NOT CHANGE PSW
10832                                   ;*****************************************************************************
10833   045364                          TS410:
10834
10835   045364  012702  170000                 MOV     #170000,R2      ;LOAD 'PRESENT & EXPECTED'' PSW VALUE INTO R2
10836   045370  010267  132402         2$:     MOV     R2,PSW          ;GO TO USER MODE-PRIORITY 0
10837   045374  012746  000340                 MOV     #340,-(SP)      ;PUT A NEW PSW (PRIORITY=7) ON STACK
10838   045400  012746  045406                 MOV     #3$,-(SP)       ;PUT NEW PC ON THE STACK
10839   045404  000002                         RTI                     ;DO AN RTI FROM USER MODE
10840   045406  016701  132364         3$:     MOV     PSW,R1          ;READ NEW PSW INTO R1
10841   045412  042701  007437                 BIC     #7437,R1        ;MASK OFF COND. CODE, T-BIT, AND UNUSED BITS
10842   045416  005067  132354                 CLR     PSW             ;GO BACK TO KERNEL MODE
10843   045422  020201                         CMP     R2,R1           ;DID PSW STAY IN USER, PRIORITY=0?
10844   045424  001401                         BEQ     TS411
10845   045426  104000                         EMT                     ;PSW CHANGED BY AN RTI FROM USER
10846                                                                   ;FOR A TIGHTER SCOPE LOOP
10847                                                                   ;REPLACE ERROR CALL WITH
10848                                                                   ;'BR=2$'' = 000760
10849
10850
10851                                   ;*****************************************************************************
10852                                   ;TEST 411       KT ERROR SERVICED BEFORE TIMEOUT ERROR
10853                                   ;*****************************************************************************
10854   045430                          TS411:
10855   045430  012705  077006         1$:     MOV     #77006,R5       ;LOAD PDR7 DATA INTO R5
10856   045434  010567  124656                 MOV     R5,KIPDR7       ;MAP PAGE 7 R/W  PLF=176
10857   045440  012737  045460  000004         MOV     #3$,@#4         ;SET CPU TRAP VECTOR TO ADDRESS OF 3$
10858   045446  012737  045462  000250         MOV     #4$,@#250       ;SET M.M. TRAP VECTOR TO ADDRESS OF 4$
10859   045454  005237  177700         2$:     INC     @#177700        ;CAUSE PLF ABORT AND POTENTIAL TIMEOUT
10860   045460                         3$:
10861   045460  104000                         EMT                     ;TRAPPED THRU CPU TRAP VECTOR BUT SHOULDN'T HAVE
10862                                                                   ;FOR TIGHTER SCOPE LOOP
10863                                                                   ;REPLACE ERROR CALL WITH
10864                                                                   ;'BR 2$'' = 000776
10865   045462  012706  001000         4$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER TRAPPING
10866   045466  016767  132100  171656         MOV     SR0,WASSR0      ;READ STATUS REG.0
10867   045474  016767  132076  171652 5$:     MOV     SR2,WASSR2      ;READ STATUS REG. 2
10868   045502  012700  040017                 MOV     #40017,R0       ;LOAD EXPECTED SR0 CONTENTS INTO R0
10869   045506  020067  171640                 CMP     R0,WASSR0       ;SR0 PLF ERROR BIT SET?
10870   045512  001401                         BEQ     6$
10871   045514  104000                         EMT                     ;SR0 DIDN'T REPORT PLF ERROR
10872                                                                   ;FOR TIGHTER SCOPE LOOP
10873                                                                   ;REPLACE ERROR CALL WITH
10874                                                                   ;'BR 2$'' = 000741
10875   045516  012701  045454         6$:     MOV     #2$,R1          ;LOAD EXPECTED SR2 CONTENTS INTO R1
10876   045522  020167  171626                 CMP     R1,WASSR2       ;WAS SR2 LOCKED BY PLF ABORT?
10877   045526  001401                         BEQ     7$
10878   045530  104000                         EMT                     ;SR2 DIDN'T LOCK UP VIRTUAL ADDRESS
10879                                                                   ;FOR TIGHTER SCOPE LOOP
10880                                                                   ;REPLACE ERROR CALL WITH
10881                                                                   ;'BR 2$'' = 000741
10882   045532  042767  160000  132032 7$:     BIC     #160000,SR0     ;CLEAR ERROR BITS THAT WERE SET IN SR0
10883   045540  012737  021336  000004         MOV     #T04,@#4        ;RESTORE ADDRESS OF NORMAL CPU TRAP HANDLER
10884   045546  012737  021356  000250         MOV     #T0250,@#250    ;RESTORE ADDRESS OF NORMAL M.M. TRAP HANDLER
```

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10885  045554  012767  077406  124534          MOV     #77406,KIPDR7   ;REMAP PAGE 7 TO READ/WRITE PLF=177
10886
10887
10888                                  ;*****************************************************************************
10889                                  ;TEST 412       PC & PSW SAVED FOR KT ERROR DURING SERVICE OF TIMEOUT ERROR
10890                                  ;*****************************************************************************
10891  045562                          TS412:
10892  045562  004767  002260          1$:     JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
10893  045566  012767  001400  132052          MOV     #1400,UIPAR3    ;MAP USER PAGE 3 TO 24-28K
10894  045574  012767  001400  132046          MOV     #1400,UIPAR4    ;MAP USER PAGE 4 TO 24-28K
10895  045602  012767  077402  131776          MOV     #77402,UIPDR3   ;MAP USER PAGE 3 READ-ONLY
10896  045610  012767  077406  131772          MOV     #77406,UIPDR4   ;MAP USER PAGE 4 READ/WRITE
10897  045616  012737  045664  000004          MOV     #4$,@#4         ;LOAD ADDRESS OF 4$ IN CPU (TIMEOUT) VECTOR
10898  045624  012737  140017  000006          MOV     #140017,@#6     ;LOAD PSW THAT SHOULD BE PUT ON STACK IN VECTOR+2
10899  045632  012737  045664  000250          MOV     #4$,@#250       ;LOAD ADDRESS OF 4$ IN M.M. TRAP VECTOR
10900  045640  012737  000340  000252          MOV     #340,@#252      ;LOAD A KERNEL PSW IN MMVEC+2
10901  045646  012767  140000  132122  2$:     MOV     #140000,PSW     ;GO TO USER MODE
10902  045654  012706  100002                  MOV     #100002,USP     ;SET USER STACK PTR. SO SECOND PUSH IS IN PG. 3
10903  045660  005737  177700          3$:     TST     @#177700        ;CAUSE TIMEOUT ERROR THAT WILL CAUSE
10904                                                                  ;R/O ERROR WHEN TRY TO SAVE OLD PC
10905  045664  016601  000002          4$:     MOV     2(KSP),R1       ;PUT PSW SAVED ON KERNEL STACK INTO R1
10906  045670  011603                          MOV     (KSP),R3        ;PUT PC SAVED ON KERNEL STACK INTO R3
10907  045672  016767  131674  171452          MOV     SR0,WASSR0      ;READ THE CONTENTS OF M.M. STATUS REG. 0
10908  045700  016767  131672  171446          MOV     SR2,WASSR2      ;READ THE CONTENTS OF M.M. STATUS REG. 2
10909  045706  042767  160000  131656          BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
10910  045714  005067  132056                  CLR     PSW             ;BE SURE IN KERNEL MODE
10911  045720  012706  001000                  MOV     #KERSTK,KSP     ;RESTORE KERNEL STACK POINTER
10912  045724  012767  140000  132044          MOV     #140000,PSW     ;GO TO USER MODE
10913  045732  012706  000600                  MOV     #USESTK,USP     ;RESTORE USER STACK POINTER
10914  045736  005067  132034                  CLR     PSW             ;GO BACK TO KERNEL MODE
10915  045742  005067  171412                  CLR     $TMP0           ;CLEAR ERROR INDICATOR
10916  045746  020127  170017                  CMP     R1,#170017      ;WAS THE PSW SAVED THE ONE PICKED UP BY THE
10917                                                                  ;TIMEOUT TRAP FROM ERRVEC+2?
10918                                                                  ;VALUE 170017 = PSW FROM LOC. 6 WITH
10919                                                                  ;PREVIOUS MODE BITS = USER
10920  045752  001402                          BEQ     5$              ;BRANCH IF YES
10921  045754  005267  171400                  INC     $TMP0           ;WRONG PSW SAVED DURING "DOUBLE ERROR" SEQUENCE
10922  045760  020327  045664          5$:     CMP     R3,#3$+4        ;WAS THE PC AT THE TIME OF THE TIMEOUT ERROR
10923                                                                  ;SAVED ON THE STACK?
10924  045764  001402                          BEQ     6$              ;BRANCH IF YES
10925  045766  005267  171366                  INC     $TMP0           ;WRONG PC SAVED DURING TRAP SEQUENCE
10926  045772  026727  171354  020147  6$:     CMP     WASSR0,#20147   ;DID SR0 REPORT - USER, PAGE 3, R/O ABORT?
10927  046000  001402                          BEQ     7$              ;BRANCH IF YES
10928  046002  005267  171352                  INC     $TMP0           ;SR0 DID NOT REPORT R/O ABORT
10929  046006  026727  171342  045660  7$:     CMP     WASSR2,#3$      ;DID SR2 LOCK UP VIRTUAL ADDR. OF LAST
10930                                                                  ;INSTRUCTION SUCCESSFULLY FETCHED?
10931  046014  001402                          BEQ     8$              ;BRANCH IF YES
10932  046016  005267  171336                  INC     $TMP0           ;SR2 DID NOT LOCK UP ADDR. OF TIMEOUT INST.
10933  046022  005767  171332          8$:     TST     $TMP0           ;ANY "ERRORS" DURING TRAP SEQUENCE?
10934  046026  001401                          BEQ     9$
10935  046030  104000                          EMT                     ;THE WRONG PC OR PSW WERE SAVED
10936                                                                  ;OR SR0 OR SR2 DID NOT REPORT R/O
10937                                                                  ;ERROR DURING TIMEOUT - KT TRAP
10938                                                                  ;SEQUENCE
10939                                                                  ;FOR TIGHTER SCOPE LOOP
10940                                                                  ;REPLACE ERROR CALL WITH
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10941                                                   ;'BR 2$'' = 000710
10942  046032  012737  021336  000004  9$:     MOV     #T04,@#4        ;RESTORE ADDRESS OF NORMAL CPU TRAP HANDLER
10943  046040  012737  000340  000006          MOV     #340,@#6        ;RELOAD ERRVEC+2 WITH KERNEL PSW
10944  046046  012737  021356  000250          MOV     #T0250,@#250    ;RESTORE ADDRESS OF NORMAL M.M. TRAP HANDLER
10945  046054  012767  077406  131524          MOV     #77406,UIPDR3   ;REMAP USER PAGE 3 READ/WRITE
10946  046062  004767  002014                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
10947                                          ;*******************************************************************************
10948                                          ;*
10949                                          ;*      THIS GROUP OF TESTS WILL TEST ALL THE LOGIC ASSOCIATED WITH
10950                                          ;*      THE 'MOVE FROM PREVIOUS'' AND MOVE TO PREVIOUS'' INSTRUCTIONS.
10951                                          ;*
10952                                          ;*******************************************************************************
10953
10954
10955                                          ;*******************************************************************************
10956                                          ;TEST 413       MOVE FROM PREVIOUS (USER) I-SPACE
10957                                          ;*******************************************************************************
10958  046066                                  TS413:
10959  046066  005067  124246          1$:     CLR     KIPAR0          ;MAP KERNEL PAGE 0 TO 0-4K
10960  046072  012767  000200  124242          MOV     #200,KIPAR1     ;MAP KERNEL PAGE 1 TO 4-8K
10961  046100  012767  000400  124236          MOV     #400,KIPAR2     ;MAP KERNEL PAGE 2 TO 8-12K
10962  046106  012767  000600  124232          MOV     #600,KIPAR3     ;MAP KERNEL PAGE 3 TO 12-16K
10963  046114  012767  001400  124226          MOV     #1400,KIPAR4    ;MAP KERNEL PAGE 4 TO 24-28K
10964  046122  012767  007600  124226          MOV     #7600,KIPAR7    ;MAP KERNEL PAGE 7 TO THE I/O PAGE
10965  046130  012700  077406                  MOV     #77406,R0       ;MAKE ALL KERNEL I-SPACE PAGES RESIDENT
10966                                                                  ;READ/WRITE, LENGTH 200 BLOCKS
10967  046134  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
10968  046140  012701  172300                  MOV     #KIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
10969  046144  010021                  2$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
10970  046146  077202                          SOB     R2,2$           ;LOOP TO 2$ UNTIL ALL PDRS LOADED
10971  046150  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
10972  046154  012701  177600                  MOV     #UIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
10973  046160  010021                  3$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
10974  046162  077202                          SOB     R2,3$           ;LOOP TO 3$ UNTIL ALL PDRS LOADED
10975  046164  012767  000000  131446          MOV     #000,UIPAR0     ;MAP USER I PAGE 0 TO 0-4K
10976  046172  012767  000200  131442          MOV     #200,UIPAR1     ;MAP USER I PAGE 1 TO 4-8K
10977  046200  012767  000400  131436          MOV     #400,UIPAR2     ;MAP USER I PAGE 2 TO 8-12K
10978  046206  012767  000600  131432          MOV     #600,UIPAR3     ;MAP USER I PAGE 3 TO 12-16K
10979  046214  012767  007600  131434          MOV     #7600,UIPAR7    ;MAP USER I PAGE 7 TO THE I/O PAGE
10980  046222                          4$:
10981  046222  012767  077406  124060          MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
10982  046230  012767  001400  124112          MOV     #1400,KIPAR4    ;MAP KERNEL I PAGE 4 TO 24K
10983  046236  012767  001400  131404          MOV     #1400,UIPAR4    ;MAP USER I PAGE 4 TO 24K
10984  046244  012700  036514                  MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
10985  046250  010037  100000                  MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 140000
10986  046254  012767  046552  131766          MOV     #23$,MMVEC      ;SET M.M. VECTOR TO 23$
10987  046262  105067  124022                  CLRB    KIPDR4          ;MAKE KERNEL I-SPACE PAGE 4 NON-RESIDENT
10988                                          ;THE FOLLOWING WILL TEST DSTM=0 MFPI
10989                                          ;
10990  046266  012767  030340  131502  5$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
10991  046274  006506                  6$:     MFPI    USP             ;PUT USER STACK POINTER ON KERNEL
10992                                                                  ;STACK
10993  046276  022706  001000                  CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON STACK AT 6$
10994  046302  001405                          BEQ     7$              ;BRANCH IF NOTHING WAS PUSHED
10995  046304  012600                          MOV     (KSP)+,R0       ;POP KERNEL STACK INTO R0
10996  046306  012701  000600                  MOV     #USESTK,R1      ;EXPECTING TO GET 700 AS USP
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10997  046312  020001                          CMP     R0,R1           ;DID YOU GET THE RIGHT POINTER?
10998  046314  001401                          BEQ     8$
10999  046316                          7$:
11000  046316  104000                          EMT                     ;WRONG THING WAS PUSHED ON STACK
11001                                                                  ;FOR TIGHTER SCOPE LOOP
11002                                                                  ;REPLACE ERROR CALL WITH
11003                                                                  ;'BR 5$'' = 000763
11004  046320                          8$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
11005  046320  012700  036514                  MOV     #36514,R0       ;RELOAD DATA PATTERN IN R0
11006  046324  012767  030340  131444  9$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11007  046332  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11008  046336  006512                          MFPI    (R2)            ;READ FROM PHYSICAL 140000
11009  046340  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11010  046342  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11011  046344  001401                          BEQ     10$
11012  046346  104000                          EMT                     ;WRONG DATA WAS FETCHED
11013                                                                  ;FOR TIGHTER SCOPE LOOP
11014                                                                  ;REPLACE ERROR CALL WITH
11015                                                                  ;'BR 9$'' = 000766
11016  046350                          10$:    ;THE FOLLOWING WILL TEST DSTM=2 MFPI.
11017  046350  012767  030340  131420  11$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11018  046356  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11019  046362  006522                          MFPI    (R2)+           ;READ FROM PHYSICAL 140000
11020  046364  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11021  046366  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11022  046370  001401                          BEQ     12$
11023  046372  104000                          EMT                     ;WRONG DATA WAS FETCHED
11024                                                                  ;FOR TIGHTER SCOPE LOOP
11025                                                                  ;REPLACE ERROR CALL WITH
11026                                                                  ;'BR 11$'' = 000766
11027  046374                          12$:    ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
11028  046374  012767  030340  131374  13$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11029  046402  006537  100000                  MFPI    @#100000        ;READ FROM PHYSICAL 140000
11030  046406  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11031  046410  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11032  046412  001401                          BEQ     14$
11033  046414  104000                          EMT                     ;WRONG DATA WAS FETCHED
11034                                                                  ;FOR TIGHTER SCOPE LOOP
11035                                                                  ;REPLACE ERROR CALL WITH
11036                                                                  ;'BR 13$'' = 000767
11037  046416                          14$:    ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
11038  046416  012767  030340  131352  15$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11039  046424  012702  100002                  MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11040  046430  006542                          MFPI    -(R2)           ;READ FROM PHYSICAL 140000
11041  046432  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11042  046434  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11043  046436  001401                          BEQ     16$
11044  046440  104000                          EMT                     ;WRONG DATA WAS FETCHED
11045                                                                  ;FOR TIGHTER SCOPE LOOP
11046                                                                  ;REPLACE ERROR CALL WITH
11047                                                                  ;'BR 15$'' = 000766
11048  046442                          16$:
11049                                          ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
11050                                          ;
11051  046442  012767  030340  131326  17$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11052  046450  012767  100000  170706          MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
```

```
11053  046456  012702  037366            MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF $TMP2+2 INTO R2
11054  046462  006552                    MFPI    @-(R2)          ;READ FROM PHYSICAL 140000
11055  046464  012601                    MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11056  046466  020001                    CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11057  046470  001401                    BEQ     18$
11058  046472  104000                    EMT                     ;WRONG DATA WAS FETCHED
11059                                                           ;FOR TIGHTER SCOPE LOOP
11060                                                           ;REPLACE ERROR CALL WITH
11061                                                           ;'BR 17$'' = 000763
11062  046474                    18$:    ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
11063                                    ;
11064  046474  012767  030340  131274 19$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11065  046502  005002                    CLR     R2              ;MAKE REGISTER 2 A ZERO
11066  046504  006562  100000            MFPI    100000(R2)      ;READ FROM PHYSICAL 140000
11067  046510  012601                    MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11068  046512  020001                    CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11069  046514  001401                    BEQ     20$
11070  046516  104000                    EMT                     ;WRONG DATA WAS FETCHED
11071                                                           ;FOR TIGHTER SCOPE LOOP
11072                                                           ;REPLACE ERROR CALL WITH
11073                                                           ;'BR 19$'' = 000766
11074  046520                    20$:    ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
11075                                    ;
11076  046520  012767  030340  131250 21$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11077  046526  012767  100000  170630        MOV     #100000,$TMP2   ;LOAD TEST LOC. V.A. INTO $TMP2
11078  046534  012702  037364            MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
11079  046540  006572  000000            MFPI    @0(R2)          ;USE $TMP2 TO FETCH VIRTUAL
11080                                                           ;ADDRESS OF 140000
11081  046544  012601                    MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11082  046546  020001                    CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11083  046550  001401                    BEQ     22$
11084  046552                    23$:
11085  046552  104000                    EMT                     ;WRONG DATA WAS FETCHED
11086                                                           ;FOR TIGHTER SCOPE LOOP
```

```
 11087                                                                  ;REPLACE ERROR CALL WITH
 11088                                                                  ;''BR 21$'' = 000762
 11089  046554  012767  021356  131466  22$:    MOV     #T0250,MMVEC    ;SET M.M. VECTOR TO NORMAL ROUTINE
 11090
 11091
```

```
11092                                   ;*****************************************************************************
11093                                   ;TEST 414       MOVE TO PREVIOUS (USER) I-SPACE
11094                                   ;*****************************************************************************
11095   046562                          TS414:
11096   046562  012767  077406  123520  1$:     MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
11097   046570  012767  077406  131012          MOV     #77406,UIPDR4   ;USER I-SPACE PAGE 4 READ/WRITE
11098   046576  012767  001400  123544          MOV     #1400,KIPAR4    ;MAP KERNEL I PAGE 4 TO 24K
11099   046604  012767  001400  131036          MOV     #1400,UIPAR4    ;MAP USER I PAGE 4 TO 24K
11100   046612  012767  047304  131430          MOV     #20$,MMVEC      ;SET M.M. VECTOR TO 20$
11101                                           ;THE FOLLOWING WILL TEST DSTM=0 MTPI
11102                                           ;
11103   046620  012767  030340  131150  2$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11104   046626  012746  007777                  MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
11105   046632  006606                          MTPI    USP             ;LOAD USER STACK POINTER
11106   046634  006506                          MFPI    USP             ;READ USER STACK POINTER
11107   046636  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11108   046640  022701  007777                  CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED
11109   046644  001401                          BEQ     3$
11110   046646  104000                          EMT                     ;USER STACK POINTER NOT CHANGED
11111                                                                   ;FOR TIGHTER SCOPE LOOP
11112                                                                   ;REPLACE ERROR CALL WITH
11113                                                                   ;'BR 2$'' = 000764
11114   046650  012767  030340  131120  3$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11115   046656  012746  000600                  MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER S. POINT
11116   046662  006606                          MTPI    USP             ;RESTORE USER STACK POINTER
11117   046664                          4$:     ;THIS WILL TEST DSTM = 1 MTPI.
11118   046664  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11119   046670  012700  125252                  MOV     #125252,R0      ;LOAD TEST DATA INTO R0
11120   046674  010046                  5$:     MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
11121   046676  105067  123406                  CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
11122   046702  006612                          MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 140000
11123   046704  112767  000006  123376          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
11124   046712  011201                          MOV     (R2),R1         ;READ FROM ADDRESS 140000
11125   046714  020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED AT CORRECT PLACE
11126   046716  001401                          BEQ     6$
11127   046720  104000                          EMT                     ;INCORRECT STORE
11128                                                                   ;FOR TIGHTER SCOPE LOOP
11129                                                                   ;REPLACE ERROR CALL WITH
11130                                                                   ;'BR 5$'' = 000765
11131   046722                          6$:     ;THE FOLLOWING WILL TEST DSTM=2 MTPI.
11132                                           ;
11133   046722  012767  030340  131046          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11134   046730  012700  125252                  MOV     #125252,R0      ;LOAD TEST DATA INTO R0
11135   046734  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11136   046740  010046                  8$:     MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
11137   046742  105067  123342                  CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
11138   046746  006612                          MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 140000
11139   046750  112767  000006  123332          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESISENT
11140   046756  013701  100000                  MOV     @#100000,R1     ;READ FROM ADDRESS 140000
11141   046762  020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
11142   046764  001401                          BEQ     9$
11143   046766  104000                          EMT                     ;INCORRECT STORE
11144                                                                   ;FOR TIGHTER SCOPE LOOP
11145                                                                   ;REPLACE ERROR CALL WITH
11146                                                                   ;'BR 8$'' = 000764
11147   046770                          9$:     ;THIS WILL TEST DSTM = 3 MTPI.
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11148  046770  012767  030340  131000          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11149  046776  012700  052525                  MOV     #52525,R0       ;LOAD TEST DATA INTO R0
11150  047002  010046                  10$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
11151  047004  105067  123300                  CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
11152  047010  006637  100000                  MTPI    @#100000        ;LOAD TEST DATA INTO PHYSICAL 140000
11153  047014  112767  000006  123266          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
11154  047022  013701  100000                  MOV     @#100000,R1     ;READ FROM ADDRESS 140000
11155  047026  020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
11156  047030  001531                          BEQ     TS415
11157  047032  104000                          EMT                     ;
11158  047034  001401                          BEQ     11$
11159  047036  104000                          EMT                     ;INCORRECT STORE
11160                                                                  ;FOR TIGHTER SCOPE LOOP
11161                                                                  ;REPLACE ERROR CALL WITH
11162                                                                  ;'BR 10$'' = 000763
11163  047040                          11$:    ;THIS WILL TEST DSTM = 4 MTPI.
11164  047040  012767  030340  130730          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11165  047046  012700  125252                  MOV     #125252,R0      ;LOAD TEST DATA INTO R0
11166  047052  010046                  12$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
11167  047054  012702  100002                  MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11168  047060  105067  123224                  CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
11169  047064  006642                          MTPI    -(R2)           ;LOAD TEST DATA INTO PHYSICAL 140000
11170  047066  112767  000006  123214          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
11171  047074  013701  100000                  MOV     @#100000,R1     ;READ FROM ADDRESS 140000
11172  047100  020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
11173  047102  001401                          BEQ     13$
11174  047104  104000                          EMT                     ;INCORRECT STORE
11175                                                                  ;FOR TIGHTER SCOPE LOOP
11176                                                                  ;REPLACE ERROR CALL WITH
11177                                                                  ;'BR 12$'' = 000762
11178  047106                          13$:    ;THE FOLLOWING WILL TEST DSTM=5 MTPI.
11179                                          ;
11180  047106  012767  030340  130662          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11181  047114  012700  052525                  MOV     #52525,R0       ;LOAD TEST DATA INTO R0
11182  047120  012702  037366                  MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF LOC. $TMP2+2 INTO R2
11183  047124  012767  100000  170232          MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOC. INTO $TMP2
11184  047132  010046                  14$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
11185  047134  105067  123150                  CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
11186  047140  006652                          MTPI    @-(R2)          ;LOAD TEST DATA INTO PHYSICAL 140000
11187  047142  112767  000006  123140          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
11188  047150  013701  100000                  MOV     @#100000,R1     ;READ FROM ADDRESS 140000
11189  047154  020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
11190  047156  001401                          BEQ     15$
11191  047160  104000                          EMT                     ;INCORRECT STORE
11192                                                                  ;FOR TIGHTER SCOPE LOOP
11193                                                                  ;REPLACE ERROR CALL WITH
11194                                                                  ;'BR 14$'' = 000764
11195  047162                          15$:    ;THIS WILL TEST DSTM = 6 MTPI.
11196                                          ;
11197  047162  012767  030340  130606          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11198  047170  012700  052525                  MOV     #52525,R0       ;LOAD TEST DATA INTO R0
11199  047174  005002                          CLR     R2              ;MAKE REGISTER 2 ZERO
11200  047176  010046                  16$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
11201  047200  105067  123104                  CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
11202  047204  006662  100000                  MTPI    100000(R2)      ;LOAD TEST DATA INTO PHYSICAL 140000
11203  047210  112767  000006  123072          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
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11204  047216  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 140000
11205  047222  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
11206  047224  001401                  BEQ     17$
11207  047226  104000                  EMT                     ;INCORRECT STORE
11208                                                          ;FOR TIGHTER SCOPE LOOP
11209                                                          ;REPLACE ERROR CALL WITH
11210                                                          ;'BR 16$'' = 000763
11211  047230                  17$:    ;THE FOLLOWING WILL TEST DSTM=7 MTPI.
11212                                  ;
11213  047230  012767  030340  130540  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
11214  047236  012700  125252          MOV     #125252,R0      ;LOAD TEST DATA INTO R0
11215  047242  012767  100000  170114  MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOCATION
11216                                                          ;INTO LOCATION $TMP2
11217  047250  012702  037364          MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
11218  047254  010046          18$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
11219  047256  105067  123026          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
11220  047262  006672  000000          MTPI    @0(R2)          ;LOAD TEST DATA INTO PHYSICAL 140000
11221  047266  112767  000006  123014  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
11222  047274  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 140000
11223  047300  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
11224  047302  001401                  BEQ     19$
11225  047304                  20$:
11226  047304  104000                  EMT                     ;INCORRECT STORE
11227                                                          ;FOR TIGHTER SCOPE LOOP
11228                                                          ;REPLACE ERROR CALL WITH
11229                                                          ;'BR 18$'' = 000763
11230  047306  012767  021356  130734  19$:    MOV     #T0250,MMVEC    ;RESTORE M.M. VECTOR TO NORMAL ROUTINE
11231
11232
11233
11234                                  ;*****************************************************************************
11235                                  ;TEST 415       MOVE FROM PREVIOUS (KERNEL) I-SPACE TO USER MODE
11236                                  ;*****************************************************************************
11237  047314                  TS415:
11238  047314  012700  077406          1$:     MOV     #77406,R0       ;MAKE ALL USER I-SPACE PAGES RESIDENT
11239                                                          ;READ/WRITE, LENGTH 200 BLOCKS
11240  047320  012702  000010          MOV     #10,R2          ;SET LOOP COUNTER TO 8
11241  047324  012701  177600          MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR IN R1
11242  047330  010021          2$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
11243  047332  077202                  SOB     R2,2$           ;LOOP UNTIL 8 USER PDRS LOADED
11244  047334  012767  140340  130434  3$:     MOV     #140340,PSW     ;GO TO USER MODE FOR THIS TEST
11245  047342  012767  077406  122740          MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
11246  047350  012767  001400  122772          MOV     #1400,KIPAR4    ;MAP KERNEL I PAGE 4 TO 24K
11247  047356  012767  001400  130264          MOV     #1400,UIPAR4    ;MAP USER I PAGE 4 TO 24K
11248  047364  012700  036514                  MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
11249  047370  010037  100000                  MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 140000
11250  047374  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11251                                          ;THE FOLLOWING WILL TEST DSTM=0 MFPI
11252                                          ;
11253  047400  012767  047676  130642          MOV     #21$,MMVEC      ;SET M.M. VECTOR TO 21$
11254  047406  105067  130176                  CLRB    UIPDR4          ;MAKE USER I-SPACE PAGE 4 NON-RESIDENT
11255  047412  012767  140340  130356          MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
11256  047420  006506          4$:     MFPI    KSP             ;PUT KERNEL STACK POINTER ON USER STACK
11257  047422  022706  000600                  CMP     #USESTK,USP     ;WAS SOMETHING PUSHED ON STACK AT 1$
11258  047426  001405                  BEQ     5$              ;BRANCH IF NOTHING WAS PUSHED
11259  047430  012600                  MOV     (USP)+,R0       ;POP USER STACK INTO R0
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11260  047432  012701  001000            MOV     #KERSTK,R1      ;EXPECTING 1100 AS KSP
11261  047436  020001                    CMP     R0,R1           ;DID YOU GET THE RIGHT POINTER?
11262  047440  001401                    BEQ     6$
11263  047442                    5$:
11264  047442  104000                    EMT                     ;WRONG THING WAS PUSHED ON STACK
11265                                                             ;FOR TIGHTER SCOPE LOOP
11266                                                             ;REPLACE ERROR CALL WITH
11267                                                             ;'BR 4$'' = 000766
11268  047444                    6$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
11269  047444  012767  140340  130324 7$:  MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
11270  047452  012700  036514            MOV     #36514,R0       ;LOAD DATA EXPECTED INTO R0
11271  047456  012702  100000            MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11272  047462  006512                    MFPI    (R2)            ;READ FROM PHYSICAL 140000
11273  047464  012601                    MOV     (USP)+,R1       ;POP USER STACK INTO R1
11274  047466  020001                    CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11275  047470  001401                    BEQ     9$
11276  047472  104000                    EMT                     ;WRONG DATA WAS FETCHED
11277                                                             ;FOR TIGHTER SCOPE LOOP
11278                                                             ;REPLACE ERROR CALL WITH
11279                                                             ;'BR 7$'' = 000764
11280                                    ;THE FOLLOWING WILL TEST DSM=2 MFPI.
11281  047474  012767  140340  130274 9$:  MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
11282  047502  012702  100000            MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11283  047506  006522                    MFPI    (R2)+           ;READ FROM PHYSICAL 140000
11284  047510  012601                    MOV     (USP)+,R1       ;POP USER STACK INTO R1
11285  047512  020001                    CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11286  047514  001401                    BEQ     11$
11287  047516  104000                    EMT                     ;WRONG DATA WAS FETCHED
11288                                                             ;FOR TIGHTER SCOPE LOOP
11289                                                             ;REPLACE ERROR CALL WITH
11290                                                             ;'BR 9$'' = 000766
11291                                    ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
11292  047520  012767  140340  130250 11$: MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
11293  047526  006537  100000            MFPI    @#100000        ;READ FROM PHYSICAL 140000
11294  047532  012601                    MOV     (USP)+,R1       ;POP USER STACK INTO R1
11295  047534  020001                    CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11296  047536  001401                    BEQ     13$
11297  047540  104000                    EMT                     ;WRONG DATA WAS FETCHED
11298                                                             ;FOR TIGHTER SCOPE LOOP
11299                                                             ;REPLACE ERROR CALL WITH
11300                                                             ;'BR 11$'' = 000767
11301                                    ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
11302  047542  012767  140340  130226 13$: MOV     #140340,PSW     ;MAKE PREVIOUS MODE DERNEL PRESENT USER
11303  047550  012702  100002            MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
11304  047554  006542                    MFPI    -(R2)           ;READ FROM PHYSICAL 140000
11305  047556  012601                    MOV     (USP)+,R1       ;POP USER STACK INTO R1
11306  047560  020001                    CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11307  047562  001401                    BEQ     15$
11308  047564  104000                    EMT                     ;WRONG DATA WAS FETCHED
11309                                                             ;FOR TIGHTER SCOPE LOOP
11310                                                             ;REPLACE ERROR CALL WITH
11311                                                             ;'BR 13$'' = 000766
11312                                    ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
11313                                    ;
11314  047566  012767  140340  130202 15$: MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
11315  047574  012767  100000  167562      MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
```

```
11316  047602  012702  037366              MOV     #<$TMP2+2>,R2   ;LOAD ADDRESS OF $TMP2+2 INTO R2
11317  047606  006552                      MFPI    @-(R2)          ;READ FROM PHYSICAL 140000
11318  047610  012601                      MOV     (USP)+,R1       ;POP USER STACK INTO R1
11319  047612  020001                      CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11320  047614  001401                      BEQ     17$
11321  047616  104000                      EMT                     ;WRONG DATA WAS FETCHED
11322                                                              ;FOR TIGHTER SCOPE LOOP
11323                                                              ;REPLACE ERROR CALL WITH
11324                                                              ;'BR 15$'' = 000763
11325                                      ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
11326                                      ;
11327  047620  012767  140340  130150  17$: MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
11328  047626  005002                      CLR     R2              ;MAKE REGISTER 2 A ZERO
11329  047630  006562  100000              MFPI    100000(R2)      ;READ FROM PHYSICAL 140000
11330  047634  012601                      MOV     (USP)+,R1       ;POP USER STACK INTO R1
11331  047636  020001                      CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11332  047640  001401                      BEQ     19$
11333  047642  104000                      EMT                     ;WRONG DATA WAS FETCHED
11334                                                              ;FOR TIGHTER SCOPE LOOP
11335                                                              ;REPLACE ERROR CALL WITH
11336                                                              ;'BR 17$'' = 000766
11337                                      ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
11338                                      ;
11339  047644  012767  140340  130124  19$: MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
11340  047652  012767  100000  167504      MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR. INTO $TMP2
11341  047660  012702  037364              MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
11342  047664  006572  000000              MFPI    @0(R2)          ;READ FROM PHYSICAL 140000
11343  047670  012601                      MOV     (USP)+,R1       ;POP USER STACK INTO R1
11344  047672  020001                      CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
11345  047674  001401                      BEQ     20$
11346  047676                          21$:
11347  047676  104000                      EMT                     ;WRONG DATA WAS FETCHED
11348                                                              ;FOR TIGHTER SCOPE LOOP
11349                                                              ;REPLACE ERROR CALL WITH
11350                                                              ;'BR 19$'' = 000762
11351  047700  012767  021356  130342  20$: MOV     #T0250,MMVEC    ;SET M.M. VECTOR TO NORMAL ROUTINE
11352  047706  012767  000340  130062      MOV     #00340,PSW      ;GO BACK TO KERNEL MODE, PREVIOUS KERNEL
11353
11354                                  ;*****************************************************************************************
11355                                  ;TEST 416       MOVE FROM/TO D-SPACE = MOVE FROM/TO I-SPACE
11356                                  ;*****************************************************************************************
11357  047714                          TS416:
11358  047714  012767  030340  130054  1$:  MOV     #030340,PSW     ;MAKE PREVIOUS MODE=USER,CURRENT=KERNEL
11359  047722  106506                      MFPD    USP             ;MFPD SHOULD ACT LIKE MFPI PUTTING
11360                                                              ;USER STACK POINTER ON THE KERNEL STACK
11361  047724  022706  001000              CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON KERNEL STACK?
11362  047730  001405                      BEQ     2$              ;BRANCH IF NO
11363  047732  012600                      MOV     (KSP)+,R0       ;POP KERNEL STACK INTO R0
11364  047734  012701  000600              MOV     #USESTK,R1      ;EXPECTING TO GET 700 AS USP
11365  047740  020001                      CMP     R0,R1           ;DID GET RIGHT POINTER VALUE?
11366  047742  001401                      BEQ     4$
11367  047744                          2$:
11368  047744  104000                      EMT                     ;WRONG THING WAS PUSHED ON STACK
11369                                                              ;FOR TIGHTER SCOPE LOOP
11370                                                              ;REPLACE ERROR CALL WITH
11371                                                              ;'BR 1$'' = 000763
```

```
11372  047746  012746  007777  4$:     MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
11373  047752  106606          MTPD    USP             ;LOAD THE USER STACK POINTER
11374  047754  106506          MFPD    USP             ;READ USER STACK POINTER
11375  047756  012601          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
11376  047760  022701  007777  CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED?
11377  047764  001401          BEQ     5$
11378  047766  104000          EMT                     ;USER STACK POINTER NOT CHANGED
11379                                                  ;FOR TIGHTER SCOPE LOOP
11380                                                  ;REPLACE ERROR CALL WITH
11381                                                  ;"BR 4$" = 000767
11382  047770  012746  000600  5$:     MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER STK. PTR.
11383  047774  106606          MTPD    USP             ;RESTORE USER STACK POINTER
11384
11385  ;******************************************************************************
11386  ;TEST 417       MOVE FROM PREVIOUS I=SPACE (PREVIOUS=CURRENT=KERNEL)
11387  ;******************************************************************************
11388  047776          TS417:
11389  047776  005037  177776  1$:     CLR     @#PSW           ;SET PREVIOUS = CURRENT = KERNEL
11390  050002  012700  001000          MOV     #KERSTK,R0      ;SETUP VALUE FOR STACK POINTER
11391  050006  010006          MOV     R0,KSP          ;LOAD STACK POINTER
11392  050010  006506          MFPI    KSP             ;THE VALUE "STACK" SHOULD BE PUSHED
11393                                                  ;BEFORE BEING DECREMENTED
11394  050012  011601          MOV     (KSP),R1        ;READ DATA WHICH WAS PUSHED
11395  050014  020001          CMP     R0,R1           ;WAS THE ORIGINAL VALUE OF THE
11396                                                  ;STACK POINTER PUSHED?
11397  050016  001401          BEQ     2$
11398  050020  104000          EMT                     ;MFPI FETCHED WRONG DATA
11399                                                  ;FOR TIGHTER SCOPE LOOP
11400                                                  ;REPLACE ERROR CALL WITH
11401                                                  ;"BR 1$" = 000766
11402  050022  005740          2$:     TST     -(R0)           ;SETUP EXPECTED STACK POINTER VALUE
11403  050024  020600          CMP     KSP,R0          ;WAS THE STACK POINTER DECREMENTED?
11404  050026  001401          BEQ     3$
11405  050030  104000          EMT                     ;STACK NOT PUSHED BY THE MFPI
11406                                                  ;FOR TIGHTER SCOPE LOOP
11407                                                  ;REPLACE ERROR CALL WITH
11408                                                  ;"BR 1$" = 000762
11409  050032  012706  001000  3$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER
11410  050036  005067  127530          CLR     SR0             ;TURN OFF MEMORY MANAGEMENT UNIT
11411  050042  000167  000472          JMP     EXATST          ;GET OVER SUBROUTINES TO EXTENDED ADRS TESTS
```

```
                                .SBTTL  *****   SUBROUTINES USED BY THIS PROGRAM   *****

                                .SBTTL  TURN OFF T-BIT AND SAVE CURRENT PSW
                                ;*******************************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS USED TO TURN OFF THE TRACE TRAP BIT IN THE PSW
                                ;*      IF IT IS ON.  THE PROCESSOR STATUS IS SAVED IN "TBITPS" SO THAT
                                ;*      THE PSW CAN BE RESTORED TO ITS PREVIOUS CONDITION WHEN CONDITIONS
                                ;*      WARRANT T-BIT TRAPPING.
                                ;*
                                ;*******************************************************************************
050046  036727  127724  000020  TOFF:   BIT     PSW,#TBIT       ;IS THE T-BIT SET IN THE PSW?
050054  001411                          BEQ     1$              ;EXIT IF NO
050056  016746  127714                  MOV     PSW,-(SP)       ;PUSH PRESENT PSW ON THE STACK
050062  011667  167270                  MOV     (SP),TBITPS     ;ALSO SAVE IT IN "TBITPS" FOR
                                                                ;RESTORING LATER
050066  04271ᴜ  000020                  BIC     #TBIT,(SP)      ;CLEAR THE T-BIT (BIT 4) IN THE PSW
050072  012746  050100                  MOV     #1$,-(SP)       ;PUSH PC OF "RTS" ON STACK
050076  000006                          RTT                     ;"RETURN" TO 1$ WITH T-BIT OFF
050100  000207                  1$:     RTS     PC              ;RETURN TO PROGRAM

                                .SBTTL  TURN ON T-BIT AND RESTORE PREVIOUS PSW
                                ;*******************************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS USED TO RESTORE THE PROCESSOR STATUS TO ITS
                                ;*      PREVIOUS CONDITION BY RESTORING THE "T-BIT PSW" SAVED BY THE
                                ;*      "TOFF" SUBROUTINE IN THE "TBITPS" LOCATION.
                                ;*
                                ;*******************************************************************************
050102  036727  167250  000020  TON:    BIT     TBITPS,#TBIT    ;WAS T-BIT ON IN THE PREVIOUS PSW?
050110  001410                          BEQ     1$              ;EXIT IF NO
050112  016746  167240                  MOV     TBITPS,-(SP)    ;PUSH PREVIOUS PSW ON THE STACK
050116  012767  000340  167232          MOV     #340,TBITPS     ;RESET THE "TBITPS" LOCATION
050124  012746  050132                  MOV     #1$,-(SP)       ;PUSH PC OF "RTS" ON STACK
050130  000006                          RTT                     ;"RETURN" TO 1$ WITH T-BIT RESTORED
050132  000207                  1$:     RTS     PC              ;RETURN TO PROGRAM

                                .SBTTL  SET ALL WRITEABLE BITS IN ALL PAR/PDR'S
                                ;*******************************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS USED BY THE PAR/PDR DUAL ADDRESSING TEST
                                ;*      TO SET ALL WRITEABLE BITS IN ALL KERNEL AND USE PAR'S AND
                                ;*      PDR'S TO A 1.  THE "INITIAL STATE" OF HAVING ALL BITS=1 IS
                                ;*      USED TO SEE THAT ONLY ONE REGISTER IS CLEARED IN RESPONSE TO
                                ;*      A SINGLE PAR OR PDR ADDRESS.
                                ;*
                                ;*******************************************************************************
050134  012702  000010  SETREG: MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
050140  012701  172300          MOV     #KIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR INTO R1
050144  012721  177777  1$:     MOV     #-1,(R1)+       ;SET BITS IN KERNEL PDR TO 1
050150  077203                  SOB     R2,1$           ;LOOP TO 1$ UNTIL ALL KERNEL PDR'S LOADED
050152  012702  000010          MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
050156  012701  172340          MOV     #KIPAR0,R1      ;LOAD ADDRESS OF FIRST PAR INTO R1
050162  012721  177777  2$:     MOV     #-1,(R1)+       ;SET BITS IN A KERNEL PAR TO 1
050166  077203                  SOB     R2,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PAR'S LOADED
```

```
11468  050170  012702  000010          MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
11469  050174  012701  177600          MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR INTO R1
11470  050200  012721  177777  3$:     MOV     #-1,(R1)+       ;SET BITS IN A USER PDR TO 1
11471  050204  077203                  SOB     R2,3$           ;LOOP TO 3$ UNTIL ALL USER PDR'S LOADED
11472  050206  012702  000010          MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
11473  050212  012701  177640          MOV     #UIPAR0,R1      ;LOAD ADDRESS OF FIRST PAR INTO R1
11474  050216  012721  177777  4$:     MOV     #-1,(R1)+       ;SET BITS IN A USER PAR TO 1
11475  050222  077203                  SOB     R2,4$           ;LOOP TO 4$ UNTIL ALL USER PAR'S LOADED
11476  050224  000207                  RTS     PC              ;RETURN TO TEST
11477
11478                           .SBTTL  READ & COMPARE KERNEL & USER PAR/PDR'S
11479                           ;*****************************************************************************
11480                           ;*
11481                           ;*      THIS SUBROUTINE IS USED BY PAR/PDR DUAL ADDRESSING TEST TO
11482                           ;*      READ ALL THE PAR'S AND PDR'S TO SEE THAT ONLY ONE REGISTER
11483                           ;*      WAS CLEARED IN RESPONSE TO A SINGLE PAR OR PDR ADDRESS.
11484                           ;*      ANY FAILURES FOUND BY THE PAR/PDR DUAL ADDRESSING TEST WILL
11485                           ;*      BE REPORTED BY THIS SUBROUTINE.
11486                           ;*
11487                           ;*****************************************************************************
11488  050226                   CMPREG:
11489  050226  012701  172300          MOV     #KIPDR0,R1      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R1
11490  050232  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
11491  050236  012705  077416          MOV     #77416,R5       ;PUT EXPECTED PDR CONTENTS IN R5
11492  050242  021105          1$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
11493  050244  001403                  BEQ     2$              ;BRANCH IF YES
11494  050246  020100                  CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
11495  050250  001401                  BEQ     2$
11496  050252  104000                  EMT                     ;A PDR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PRD
11497                                                          ;FOR TIGHTER SCOPE LOOP
11498                                                          ;REPLACE ERROR CALL WITH
11499                                                          ;AN 'RTS PC'' = 000207
11500  050254  062701  000002  2$:     ADD     #2,R1           ;FORM NEXT ADDRESS
11501  050260  077410                  SOB     R4,1$           ;LOOP TO 1$ UNTIL ALL KERNEL PDR'S CHECKED
11502  050262  012701  172340          MOV     #KIPAR0,R1      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R1
11503  050266  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
11504                                                          ;****F11 CHANGE**** FROM #7777 TO #177777
11505  050272  012705  177777          MOV     #177777,R5      ;PUT EXPECTED PAR CONTENTS IN R5
11506  050276  021105          3$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
11507  050300  001403                  BEQ     4$              ;BRANCH IF YES
11508  050302  020100                  CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
11509  050304  001401                  BEQ     4$
11510  050306  104000                  EMT                     ;A PAR WAS EFFECTED BY CLEARING A DIFFENENT PAR/PDR
11511                                                          ;FOR TIGHTER SCOPE LOOP
11512                                                          ;REPLACE ERROR CALL WITH
11513                                                          ;AN 'RTS PC'' = 000207
11514  050310  062701  000002  4$:     ADD     #2,R1           ;FORM NEXT ADDRESS
11515  050314  077410                  SOB     R4,3$           ;LOOP TO 3$ UNTIL ALL KERNEL PAR'S CHECKED
11516  050316  012701  177600          MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST USER PDR IN R1
11517  050322  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
11518  050326  012705  077416          MOV     #77416,R5       ;PUT EXPECTED PDR CONTENTS IN R5
11519  050332  021105          5$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
11520  050334  001403                  BEQ     6$              ;BRANCH IF YES
11521  050336  020100                  CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
11522  050340  001401                  BEQ     6$
11523  050342  104000                  EMT                     ;A PDR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
```

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11524
11525
11526
11527  050344  062701  000002          6$:     ADD     #2,R1           ;FORM NEXT ADDRESS
11528  050350  077410                          SOB     R4,5$           ;LOOP TO 5$ UNTIL ALL USER PDR'S CHECKED
11529  050352  012701  177640                  MOV     #UIPAR0,R1      ;LOAD ADDRESS OF FIRST USER PAR IN R1
11530  050356  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
11531                                                                  ;****F11 CHANGE**** FROM #7777 TO #177777
11532  050362  012705  177777                  MOV     #177777,R5      ;PUT EXPECTED PAR CONTENTS IN R5
11533  050366  021105                  7$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
11534  050370  001403                          BEQ     8$              ;BRANCH IF YES
11535  050372  020100                          CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
11536  050374  001401                          BEQ     8$
11537  050376  104000                          EMT                     ;A PAR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
11538                                                                  ;FOR TIGHTER SCOPE LOOP
11539                                                                  ;REPLACE ERROR CALL WITH
11540                                                                  ;AN 'RTS PC' = 000207
11541  050400  062701  000002          8$:     ADD     #2,R1           ;FORM NEXT ADDRESS
11542  050404  077410                          SOB     R4,7$           ;LOOP TO 7$ UNTIL ALL USER PAR'S CHECKED
11543  050406  000207                          RTS     PC              ;RETURN TO TEST
11544
11545                                  .SBTTL  INHIBIT 'RESETS' WHILE UNDER APT
11546                                  ;*********************************************************************************
11547                                  ;*
11548                                  ;*      THIS SUBROUTINE CONTROLS THE USAGE OF RESET INST'S WHILE
11549                                  ;*      RUNNING UNDER APT. RESETS ARE ALLOWED DURING THE FIRST
11550                                  ;*      PASS OF THE DIAGNOSTIC.
11551                                  ;*
11552  050410  126727  130404  000001  CHKAPT: CMPB    $ENV,#1         ;ARE WE RUNNING UNDER APT?
11553  050416  001003                          BNE     1$              ;NO BRANCH
11554  050420  005767  130362                  TST     $PASS           ;IS THIS THE FIRST PASS?
11555  050424  001002                          BNE     RETA            ;NO BRANCH
11556  050426  062705  000002          1$:     ADD     #2,R5           ;BUMP RETURN ADDRESS FOR NORMAL TESTING
11557  050432  000205                  RETA:   RTS     R5              ;RETURN
11558
11559
11560                                  .SBTTL  ERROR ROUTINE FOR MEMORY MANAGEMENT TEST
11561                                  ;*********************************************************************************
11562                                  ;*      THIS IS THE ONLY ERROR REPORT FOR ALL THE MMU TESTS
11563                                  ;*********************************************************************************
11564
11565  050434  012737  000002  001002  ERROR3: MOV     #2,@#$FATAL                     ;SET UP FATAL ERROR NUMBER
11566  050442  012767  000001  130330          MOV     #1,$MSGTY                       ;SET FATAL ERROR FLAG
11567  050450  032737  000001  001020          BIT     #1,@#$ENV                       ;UNDER APT ?
11568  050456  001004                          BNE     MMUHLT
11569  050460  012700  050472                  MOV     #MMUMSG,R0
11570  050464  004767  062640                  JSR     PC,TYPE
11571  050470  000777                  MMUHLT: BR      .                       ;STAY IN LOOP
11572
11573  050472  040506  046111  042105  MMUMSG: .ASCIZ  /FAILED DURING MMU TESTING/<12><15>
11574  050500  042040  051125  047111
11575  050506  020107  046515  020125
11576  050514  042524  052123  047111
11577  050522  005107  000015
11578
11579                                  .EVEN
```

```
11580
11581
11582                                   ;******************** ************************************************
11583                                   ;
11584                                   ;       STORAGE AREAS FOR THE FOLLOWING FEW TESTS
11585                                   ;
11586                                   ;*************************************************************************
11587
11588  050526  000000                   TMP:    .WORD   0
11589  050530  000000                   TMP1:   .WORD   0
11590  050532  000000                   MEM:    .WORD   0
11591  050534  000002                   CNTR:   .BLKW   2
11592                                   ;*************************************************************************************************
11593                                   ;TEST 420       TEST ADDRESS BITS 17-21
11594                                   ;*************************************************************************************************
11595  050540                           TS420:
11596                                   ;*************************************************************
11597                                   ;
11598                                   ;       THIS TEST WILL DETERMINE WHETHER THE KDF11-B CAN
11599                                   ;       DRIVE ADDRESS BITS 17-21.
11600                                   ;
11601                                   ;******* ******************************************************
11602
11603  050540  012767  177600  121610   EXATST: MOV     #177600,KIPAR7          ;I O PAGE
11604  050546  012737  000007  001004           MOV     #7,@#$TESTN
11605  050554  012737  051332  000030           MOV     #ERRORA,@#30
11606  050562  000244                           CLZ                             ;CLR THE Z BIT
11607  050564  032777  000200  150612           BIT     #200,@SWR               ;WANT TO TEST THIS ?
11608  050572  001001                           BNE     ESR3
11609  050574  000470                           BR      NEXT
11610
11611  050576  016767  127202  177722   ESR3:   MOV     ERRVEC,TMP
11612  050604  016767  127176  177716           MOV     ERRVEC+2,TMP1
11613  050612  012767  050714  127164           MOV     #ESR0,ERRVEC            ;PREPARE FOR NEW
11614  050620  012767  000340  127160           MOV     #340,ERRVEC+2           ;INTERRUPT
11615  050626  012767  004000  121514           MOV     #4000,KIPAR4            ;SET FOR ADRS BIT 17
11616  050634  012767  000001  126730           MOV     #BIT0,SR0
11617  050642  012767  000020  121646           MOV     #BIT4,SR3               ;TURN 22 BIT ADRSG AND
11618                                                                           ;MEMORY MANG ON
11619  050650  012767  000000  177656           MOV     #0,CNTR
11620  050656  026727  177652  000005   ESR1:   CMP     CNTR,#5
11621  050664  001420                           BEQ     ESR2
11622  050666  013737  100000  100000           MOV     @#100000,@#100000       ;TRY ADRSG IT
11623  050674  000240                           NOP
11624  050676  012767  000000  126666           MOV     #0,SR0
11625  050704  012767  000000  121604           MOV     #0,SR3                  ;TURN OFF MM AND 22 BIT
11626  050712  104000                           EMT                             ;ERROR
11627  050714  006367  121430           ESR0:   ASL     KIPAR4                  ;SHOULD TIME OUT
11628  050720  005267  177610                   INC     CNTR                    ;SHIFT 1 TO THE LEFT
11629  050724  000754                           BR      ESR1
11630  050726  016767  177574  127050   ESR2:   MOV     TMP,ERRVEC
11631  050734  016767  177570  127044           MOV     TMP1,ERRVEC+2           ;RESTORE
11632  050742  012767  000000  126622           MOV     #0,SR0
11633  050750  012767  000000  121540           MOV     #0,SR3                  ;TURN OFF MM AND 22 BIT
11634
11635
```

```
11636                                   ;*****************************************************************************
11637                                   ;TEST 421       TEST ADDRESS BIT 16
11638                                   ;*****************************************************************************
11639  050756                           TS421:
11640                                   ;*****************************************************************
11641                                   ;
11642                                   ;       THIS TEST WILL CHECK TO SEE IF THE 17TH BIT (16) OF AN 18 BIT
11643                                   ;       ADDRESS CAN BE DRIVEN.
11644                                   ;
11645                                   ;*****************************************************************
11646
11647  050756  012767  000001  126606   NEXT:   MOV     #BIT0,SR0                       ;TURN ON MEM MANG
11648  050764  016767  127014  177534           MOV     ERRVEC,TMP
11649  050772  016767  127010  177530           MOV     ERRVEC+2,TMP1
11650  051000  012767  051062  126776           MOV     #ESR4,ERRVEC
11651  051006  012767  000340  126772           MOV     #340,ERRVEC+2
11652  051014  012737  123456  000000           MOV     #123456,@#0                     ;MODIFY LOCATION ZERO
11653  051022  012767  002000  121320           MOV     #2000,KIPAR4
11654  051030  013737  100000  100000           MOV     @#100000,@#100000
11655  051036  023727  000000  123456           CMP     @#0,#123456                     ;CHANGED ?
11656  051044  001407                           BEQ     ESR5
11657  051046  012767  000000  126516           MOV     #0,SR0
11658  051054  012767  000000  121434           MOV     #0,SR3                  ;TURN OFF MM AND 22 BIT
11659  051062  104000                   ESR4:   EMT                                     ;LOC 0 WAS ALTERED
11660  051064  005067  126502           ESR5:   CLR     SR0                             ;TURN OFF MM
11661  051070  016767  177432  126706           MOV     TMP,ERRVEC
11662  051076  016767  177426  126702           MOV     TMP1,ERRVEC+2                   ;RESTORE VECTORS
11663
11664
11665
11666                                   ;*****************************************************************************
11667                                   ;TEST 422       TEST PARITY ERROR DETECTION LOGIC
11668                                   ;*****************************************************************************
11669  051104                           TS422:
11670
11671                                   ;*****************************************************************
11672                                   ;
11673                                   ;       THIS TEST WILL USE THE MEMORY PARITY CSR TO GENERATE
11674                                   ;       A PARITY ERROR THAT THE CPU SHOULD DETECT.
11675                                   ;
11676                                   ;*****************************************************************
11677
11678
11679  051104  000244                           CLZ                             ;CLR THE Z BIT
11680  051106  032777  001000  150270           BIT     #BIT9,@SWR              ;TEST THIS ?
11681  051114  001002                           BNE     ESR57
11682  051116  000167  000430                   JMP     Q22TST                  ;NO
11683
11684  051122  012767  000001  000370   ESR57:  MOV     #1,ERRORE               ;DUMMY BIT
11685  051130  016767  126650  177376           MOV     ERRVEC,CNTR
11686  051136  016767  126644  177372           MOV     ERRVEC+2,CNTR+2         ;SAVE VECTORS
11687  051144  012767  051162  126632           MOV     #2$,ERRVEC              ;NEW TIME OUT VECOTR
11688  051152  012704  172100                   MOV     #172100,R4              ;PLACE TO START
11689  051156  005714                   1$:     TST     (R4)                    ;IS IT THERE
11690  051160  000407                           BR      ESR7
11691  051162  022704  172136           2$:     CMP     #172136,R4              ;TOP YET ?
```

```
11692  051166  100403                    BMI     ESR6
11693  051170  062704  000002            ADD     #2,R4
11694  051174  000770                    BR      1$
11695  051176  104000            ESR6:   EMT                     ;COULD NOT FIND MEM PAR CSR
11696  051200  016767  126710  177320    ESR7:   MOV     114,TMP         ;SAVE CONTENTS OF 114
11697  051206  012767  051254  126700            MOV     #ESR8,114       ;PARITY TRAP VECTOR
11698  051214  012714  000005                    MOV     #5,(R4)         ;BITS 0,2 IN MEM CSR
11699  051220  010167  177306                    MOV     R1,MEM
11700  051224  042714  000004                    BIC     #4,(R4)         ;TURN OFF WRT WRG PAR BIT
11701  051230  016701  177276                    MOV     MEM,R1          ;SOME DATA  TO MEMORY FROM
11702  051234  012714  000000            ESR9:   MOV     #0,(R4)         ;TURN OFF P ERR
11703  051240  010167  177266                    MOV     R1,MEM
11704  051244  016767  177256  126642            MOV     TMP,114         ;RESTORE VECTOR CONTENTS
11705                                                                     ;CPU, SHOULD SET A PAR ERR
11706  051252  104000                            EMT
11707  051254  032714  100000            ESR8:   BIT     #BIT15,(R4)     ;SEE IF BIT 15 SET IN MEM CSR
11708  051260  001765                            BEQ     ESR9            ;Z IS SET IF AN ERROR
11709  051262  005000                            CLR     R0
11710  051264  005200            ESR19:  INC     R0                      ;TIME FOR LED TO BE SEEN
11711  051266  005700                            TST     R0
11712  051270  100375                            BPL     ESR19
11713  051272  012714  000000                    MOV     #0,(R4)
11714  051276  010167  177230                    MOV     R1,MEM
11715  051302  016767  177220  126604            MOV     TMP,114
11716  051310  016767  177220  126466            MOV     CNTR,ERRVEC
11717  051316  016767  177214  126462            MOV     CNTR+2,ERRVEC+2
11718  051324  005067  000170                    CLR     ERRORE          ;RESTORE DUMMY BIT
11719  051330  000510                            BR      Q22TST          ;GO FIND A Q22BE
11720                          ;*****************************************************************************
11721
11722  051332  012737  000007  001002  ERRORA: MOV     #7,@#$FATAL
11723  051340  012767  000001  127432          MOV     #1,$MSGTY
11724  051346  032737  000001  001020          BIT     #1,@#$ENV               ;UNDER APT ?
11725  051354  001013                          BNE     EXADHT
11726  051356  026727  000136  000001          CMP     ERRORE,#1               ;DUMMY BIT THERE  ?
11727  051364  001003                          BNE     ESR34
11728  051366  012700  051451                  MOV     #CSRMSG,R0
11729  051372  000402                          BR      ESR34+4
11730  051374  012700  051406          ESR34:  MOV     #EXTMSG,R0
11731  051400  004767  061724                  JSR     PC,TYPE
11732  051404  000777                  EXADHT: BR      .
11733
11734
11735  051406  040506  046111  042105  EXTMSG: .ASCIZ  /FAILED DURING EXTENDED ADRS TEST/<12><15>
11736  051414  042040  051125  047111
11737  051422  020107  054105  042524
11738  051430  042116  042105  040440
11739  051436  051104  020123  042524
11740  051444  052123  006412     000
11741
11742  051451     106  044501  042514  CSRMSG: .ASCIZ  /FAILED MEM PARITY ERROR DETECT TEST/<12><15>
11743  051456  020104  042515  020115
11744  051464  040520  044522  054524
11745  051472  042440  051122  051117
11746  051500  042040  052105  041505
11747  051506  020124  042524  052123
```

```
 11748  051514  006412      000
 11749
 11750          051520                  .EVEN
 11751  051520  000000                  ERRORE: .WORD   0               ;DUMMY BIT
 11752
 11753                                  ;*****************************************************************
 11754  051522  000510                  VECT1:  .WORD   510             ;FIRST DEV VECTOR Q22BE
 11755  051524  000000                  DEVECT: .WORD   0
 11756  051526  170000                  DEV1:   .WORD   170000                  ;FIRST DEV ADRS Q22BE
 11757  051530  000000                  DEVADR: .WORD   0
 11758  051532  000000                  CSR1:   .WORD   0
 11759  051534  000000                  CSR2:   .WORD   0
 11760  051536  000000                  BA:     .WORD   0
 11761  051540  000000                  WC:     .WORD   0
 11762  051542  000000                  DATA:   .WORD   0
 11763  051544  000000                  LATCNT: .WORD   0
 11764  051546  000000                  MVLCNT: .WORD   0
 11765  051550  000000                  SIMGOA: .WORD   0
 11766
 11767
 11768
 11769                                  ;*************************************************************************************
 11770                                  ;TEST 423       SEE IF A Q22BE(QBE) IS THERE
 11771                                  ;*************************************************************************************
 11772  051552                          TS423:
 11773
 11774                                  ;*********************************************************
 11775                                  ;
 11776                                  ;       ROUTINE TO SIZE FOR THE Q22BE(QBE) DEVICE ADDRESS
 11777                                  ;       WE WILL LOOK FOR A Q22BE(QBE). IF IT ISN'T THERE
 11778                                  ;       WE WILL CAUSE AN ERROR VIA THE EMT INSTRUCTION.
 11779                                  ;
 11780                                  ;*********************************************************
 11781
 11782  051552  000244                  Q22TST: CLZ
 11783  051554  032777  000100  147622          BIT     #BIT6,@SWR
 11784  051562  001002                          BNE     1$
 11785  051564  000167  001476                  JMP     BDVTST
 11786  051570  012737  000011  001004  1$:     MOV     #11,@#$TESTN            ;TEST NUM IN MAILBOX
 11787  051576  012737  053160  000030          MOV     #ERRORB,@#30            ;SET UP FOR CORRECT EMT
 11788
 11789
 11790  051604  005067  125762                  CLR     SR0
 11791  051610  016767  126170  176714          MOV     ERRVEC,MEM              ;STORE ERRVEC CONTENTS
 11792  051616  012767  052006  126160          MOV     #ESR99,ERRVEC
 11793  051624  016767  177676  177676          MOV     DEV1,DEVADR
 11794  051632  016767  177664  177664          MOV     VECT1,DEVECT
 11795  051640  005777  177664          ESR11:  TST     @DEVADR         ;SEE IF IT RESPONDS
 11796
 11797  051644  016767  177660  177660          MOV     DEVADR,CSR1
 11798  051652  016767  177654  177654          MOV     CSR1,CSR2
 11799  051660  062767  000002  177646          ADD     #2,CSR2                 ;YES IT DID
 11800  051666  016767  177640  177642          MOV     CSR1,BA
 11801  051674  062767  000004  177634          ADD     #4,BA
 11802  051702  016767  177624  177630          MOV     CSR1,WC
 11803  051710  062767  000006  177622          ADD     #6,WC
```

```
11804  051716  016767  177610  177616          MOV     CSR1,DATA
11805  051724  062767  000010  177610          ADD     #10,DATA
11806  051732  016767  177574  177604          MOV     CSR1,LATCNT
11807  051740  062767  000012  177576          ADD     #12,LATCNT
11808  051746  016767  177560  177572          MOV     CSR1,MVLCNT
11809  051754  062767  000014  177564          ADD     #14,MVLCNT
11810  051762  016767  177544  177560          MOV     CSR1,SIMGOA
11811  051770  062767  000016  177552          ADD     #16,SIMGOA
11812  051776  016767  176530  126000          MOV     MEM,ERRVEC              ;RESTORE ERROR VECTOR
11813  052004  000413                          BR      ESR98
11814  052006  062767  000020  177514  ESR99:  ADD     #20,DEVADR
11815  052014  062767  000004  177502          ADD     #4,DEVECT
11816  052022  026727  177476  000550          CMP     DEVECT,#550
11817  052030  001303                          BNE     ESR11                   ;GO TRY ANOTHER ADRS
11818  052032  104000                          EMT
11819  052034  016700  177464  ESR98:  MOV     DEVECT,R0
11820  052040  062700  000002                  ADD     #2,R0
11821  052044  012710  000340                  MOV     #340,(R0)
11822
11823
11824                                  ;*************************************************************************
11825                                  ;TEST 424       USE Q22BE(QBE) TO ALTER THE INTERRUPT LEVEL BITS
11826                                  ;*************************************************************************
11827  052050                          TS424:
11828
11829                                  ;*********************************************************
11830                                  ;
11831                                  ;       GENERATE A Q22BE(QBE) SOFTWARE INTR AT LEVEL 4.
11832                                  ;       THE FOLLOWING CODE WILL USE THE Q22(QBE) BUS EXERCISER
11833                                  ;       TO GENERATE INTERRUPTS THAT THE CPU SHOULD EITHER
11834                                  ;       HONOR OR IGNORE DEPENDING ON THE INTR LEVEL BITS.
11835                                  ;
11836                                  ;*********************************************************
11837
11838
11839  052050  012777  052114  177446          MOV     #ESR21,@DEVECT          ;INTERRUPT TO ESR21
11840  052056  012777  000001  177446          MOV     #1,@CSR1
11841  052064  106427  000140                  MTPS    #140            ;CPU AT LEVEL THREE
11842  052070  012777  000003  177436          MOV     #3,@CSR2
11843  052076  000240                          NOP
11844  052100  012777  000002  177426          MOV     #2,@CSR2
11845  052106  000240                          NOP
11846  052110  000240                          NOP
11847  052112  104000                          EMT
11848  052114  012777  052150  177402  ESR21:  MOV     #ESR22,@DEVECT          ;CHANGE INTR VECTOR
11849  052122  106427  000200                  MTPS    #200
11850  052126  012777  000003  177400          MOV     #3,@CSR2
11851  052134  000240                          NOP
11852  052136  012777  000000  177370          MOV     #0,@CSR2                ;INTR LEVEL IS 4
11853  052144  000240                          NOP                             ;INTR SHOULD NOT HONORED
11854  052146  000401                          BR      ESR23
11855  052150  104000                  ESR22:  EMT                             ;INTR HONORED A ERROR
11856                                  ;*********************************************************
11857                                  ;       GENERATE AN INTERRUPT AT LEVEL FIVE
11858                                  ;*********************************************************
11859
```

```
11860  052152  012777  052214  177344  ESR23:  MOV     #ESR24,@DEVECT
11861  052160  106427  000200                  MTPS    #200                    ;CPU AT LEVEL FOUR
11862  052164  012777  000001  177340          MOV     #1,@CSR1                ;TRY TO CAUSE AN INTERRUPT
11863  052172  012777  000007  177334          MOV     #7,@CSR2                ;AT LEVEL FIVE
11864  052200  000240                          NOP
11865  052202  012777  000006  177324          MOV     #6,@CSR2                ;CLRS GO  SETS DONE
11866  052210  000240                          NOP
11867  052212  104000                          EMT                             ;INTR DID NOT HAPPEN
11868  052214  012777  052250  177302  ESR24:  MOV     #ESR27,@DEVECT          ;ALTER INTR VECTOR
11869  052222  106427  000240                  MTPS    #240                    ;CHANGE LEVEL TO FIVE
11870  052226  012777  000007  177300          MOV     #7,@CSR2
11871  052234  000240                          NOP
11872  052236  012777  000000  177270          MOV     #0,@CSR2
11873  052244  000240                          NOP
11874  052246  000401                          BR      ESR28
11875  052250  104000                  ESR27:  EMT                             ;IF HERE, AN ERROR
11876                                  ;***************************************************************
11877                                  ;       TRY INTERRUPT AT LEVEL SIX
11878                                  ;***************************************************************
11879  052252  012777  052310  177244  ESR28:  MOV     #ESR29,@DEVECT
11880  052260  012777  000001  177244          MOV     #1,@CSR1                ;INTR RQST BITS TO 6
11881  052266  012777  000013  177240          MOV     #13,@CSR2
11882  052274  000240                          NOP
11883  052276  012777  000012  177230          MOV     #12,@CSR2               ;INTR SHOULD BE HONORED
11884  052304  000240                          NOP
11885  052306  104000                          EMT                             ;OTHERWISE AN ERROR
11886  052310  012777  052344  177206  ESR29:  MOV     #ESR31,@DEVECT          ;ALTER CPU INTR VECTOR
11887  052316  106427  000300                  MTPS    #300
11888  052322  012777  000013  177204          MOV     #13,@CSR2               ;SETS GO, CLRS DONE
11889  052330  000240                          NOP
11890  052332  012777  000000  177174          MOV     #0,@CSR2
11891  052340  000240                          NOP
11892  052342  000401                          BR      ESR30                   ;INTR SHOULD NOT BE HONORED
11893  052344  104000                  ESR31:  EMT                             ;BUT IF HERE, IT WAS
11894
11895                                  ;***************************************************************
11896                                  ;       GENERATE AN INTERRUPT AT LEVEL SEVEN
11897                                  ;***************************************************************
11898  052346  012777  052404  177150  ESR30:  MOV     #ESR33,@DEVECT
11899  052354  012777  000001  177150          MOV     #1,@CSR1                ;CPU AT LEVEL 6, Q22 AT 7
11900  052362  012777  000033  177144          MOV     #33,@CSR2
11901  052370  000240                          NOP
11902  052372  012777  000032  177134          MOV     #32,@CSR2
11903  052400  000240                          NOP
11904  052402  104000                          EMT
11905  052404  012777  052460  177112  ESR33:  MOV     #ESR35,@DEVECT          ;MODIFY INTR VECTOR IN CPU
11906  052412  106427  000340                  MTPS    #340
11907  052416  012777  000033  177110          MOV     #33,@CSR2
11908  052424  000240                          NOP
11909  052426  012777  000032  177100          MOV     #32,@CSR2
11910  052434  000240                          NOP
11911  052436  012777  000001  177070          MOV     #1,@CSR2                ;THIS WILL REMOVE THE
11912  052444  012777  000000  177062          MOV     #0,@CSR2                ;PENDING INTERRUPT
11913  052452  106427  000004                  MTPS    #4                      ;RESTORE THE PSW
11914  052456  000401                          BR      Q22TS1                  ;NADA SHOULD INTERRUPT
11915  052460  104000                  ESR35:  EMT                             ;ERROR IF IT DOES
```

```
11916
11917                                   ;*************************************************************************************
11918                                   ;TEST 425       DMA  DATO TRANSFER
11919                                   ;*************************************************************************************
11920  052462                           TS425:
11921
11922                                   ;*************************************************************
11923                                   ;
11924                                   ;       THIS TEST WILL SET UP AN ACTUAL DMA TRANSFER
11925                                   ;
11926                                   ;*************************************************************
11927
11928  052462  012777  065432  177052  Q22TS1: MOV     #65432,@DATA
11929  052470  012777  001601  177034           MOV     #1601,@CSR1
11930  052476  005077  177032                  CLR     @CSR2                   ;NO INTERRUPT BITS
11931  052502  012777  177776  177030          MOV     #177776,@WC                     ;TWO WORDS
11932  052510  012777  050534  177020          MOV     #CNTR,@BA
11933  052516  005067  176012                  CLR     CNTR
11934  052522  005067  176010                  CLR     CNTR+2                          ,CLEAR THESE FIRST
11935  052526  012777  000001  177014          MOV     #1,@SIMGOA                      ;SIMULT. GO BIT
11936  052534  032777  000200  176772  ESR26:  BIT     #BIT7,@CSR2             ;WAIT FOR DONE
11937  052542  001001                   ESR25:  BNE     ESR25
11938  052544  000773                           BR      ESR26
11939  052546  022767  065432  175760  ESR25:  CMP     #65432,CNTR
11940  052554  001004                           BNE     ESR32
11941  052556  022767  065432  175752          CMP     #65432,CNTR+2                   ;GOOD DATA
11942  052564  001401                           BEQ     Q22TS2
11943  052566  104000                   ESR32:  EMT                             ;NO, BAD DATA
11944
11945
11946
11947                                   ;*************************************************************************************
11948                                   ;TEST 426       TEST PWR OK LOGIC
11949                                   ;*************************************************************************************
11950  052570                           TS426:
11951
11952                                   ;*************************************************************
11953                                   ;
11954                                   ;       THIS TEST WILL DETERMINE IF THE CPU WILL RESPOND
11955                                   ;       TO THE BPOK LINE BEING ALTERED. THE Q22BE
11956                                   ;       WILL BE USED TO CONTROL THAT LINE ON THE Q BUS.
11957                                   ;
11958                                   ;*************************************************************
11959
11960  052570  000244                   Q22TS2: CLZ
11961  052572  032777  000400  146604           BIT     #BIT8,@SWR                      ;IS A Q BUS EXCER THERE
11962  052600  001002                           BNE     ESR20                           ;NO, IT'S A Q22
11963  052602  000167  000460                   JMP     BDVTST                          ;YES, THEN BYPASS THESE TESTS
11964
11965  052606  016767  125212  175712  ESR20:  MOV     24,TMP
11966  052614  016767  125206  175706          MOV     26,TMP1                         ;SAVE FOR LATER
11967  052622  012767  052674  125174          MOV     #ESR12,24
11968  052630  012767  000340  125170          MOV     #340,26         ;SET UP NEW VECTOR
11969  052636  010667  175672                  MOV     SP,CNTR                 ;SAVE STACK POINTER
11970  052642  012706  000420                   MOV     #420,SP                 ;MOVE SP WAY DOWN
11971  052646  012767  052706  125130          MOV     #ESR13,4                ;WHERE A STK OVFL WLD GO
```

```
11972  052654  012767  000340  125124          MOV     #340,6
11973  052662  012777  000040  176644          MOV     #40,@CSR2               ;SET BIT 5 IN Q22BE CSR2
11974  052670  000240                          NOP                             ;WILL PULL BPOK H LOW
11975  052672  104000                          EMT                             ;DIDNT CAUSE CPU TO GO
11976  052674  012777  000000  176632  ESR12:  MOV     #0,@CSR2                ;THRU LOC 24
11977  052702  000240                          NOP                             ;BPOK H WILL GO HIGH
11978  052704  000401                          BR      ESR14
11979  052706  104000                  ESR13:  EMT                             ;IF HERE, AN ERROR BY GOING
11980                                                                                  ;THRU LOC 4
11981  052710  016706  175620          ESR14:  MOV     CNTR,SP         ;RESTORE SOME STUFF
11982  052714  016767  175606  125102          MOV     TMP,24
11983  052722  016767  175602  125076          MOV     TMP1,26
11984  052730  000167  000000                  JMP     Q22TS3                  ;GO TO NEXT TEST
11985
11986
11987
11988                                  ;*************************************************************************************
11989                                  ;TEST 427       TEST INDIVIDUAL EXTENDED ADRS BITS
11990                                  ;*************************************************************************************
11991  052734                          TS427:
11992
11993                                  ;*************************************************************
11994                                  ;
11995                                  ;       THIS TEST WILL UTILIZE THE Q22BE LATENCY CNTR
11996                                  ;       TO CAPTURE THE EXTENDED ADDRESS BITS ON THE Q BUS.
11997                                  ;       THE Q22BE LATENCY COUNTER BITS 15-12 CORRESPOND
11998                                  ;       TO ADDRESS BITS 21-18.
11999                                  ;
12000                                  ;*************************************************************
12001
12002  052734  016767  125044  175564  Q22TS3:  MOV     4,TMP
12003  052742  016767  125040  175560          MOV     6,TMP1                  ;STORE FOR LATER
12004  052750  012767  053046  125026          MOV     #ESR15,4
12005  052756  012767  000340  125022          MOV     #340,6                  ;NEW VECTOR AND PSW
12006
12007  052764  017700  176554                  MOV     @LATCNT,R0                      ;READ IT TO CLR IT
12008  052770  012767  000020  117520          MOV     #BIT4,SR3                       ; 22 BIT ADRSNG
12009  052776  012767  010000  117344          MOV     #10000,KIPAR4                   ;SET FOR ADRS BIT 18
12010  053004  012767  010000  175524          MOV     #10000,CNTR+2
12011  053012  012767  000000  175514          MOV     #0,CNTR                 ;ZERO THESE
12012  053020  012767  000001  124544          MOV     #BIT0,SR0                       ;TURN ON MEM MANG
12013  053026  026727  175502  000017  ESR17:  CMP     CNTR,#17                ;FINISHED ?
12014  053034  001433                          BEQ     ESR16
12015  053036  105037  100000                  CLRB    @#100000                ;IF THERE IS NO MEMORY HERE
12016  053042  000240                          NOP                             ;SHOULD HAVE TIMED OUT
12017  053044  000240                          NOP                             ;WE ARE IN BIG TROUBLE
12018
12019  053046  017700  176472          ESR15:  MOV     @LATCNT,R0              ;READ LATENCY COUNTER
12020  053052  042700  007777                  BIC     #7777,R0                ;CLR DONT CARES
12021  053056  026700  175454                  CMP     CNTR+2,R0               ;EXPECTED ?
12022  053062  001407                          BEQ     ESR18                   ;EQUALS RECVD
12023  053064  012767  000000  124500          MOV     #0,SR0                  ;TURN OFF MM AND 22 BITS
12024  053072  012767  000000  117416          MOV     #0,SR3
12025  053100  104000                          EMT                             ;DATA NOT GOOD
12026  053102  005267  175426          ESR18:  INC     CNTR
12027  053106  062767  010000  117234          ADD     #10000,KIPAR4
```

```
12028  053114  062767  010000  175414          ADD     #10000,CNTR+2           ;INCREASE ADRS BITS BY ONE
12029  053122  000741                          BR      ESR17                   ;CONTINUE
12030
12031  053124  016767  175376  124652  ESR16:  MOV     TMP,4
12032  053132  016767  175372  124646          MOV     TMP1,6                  ;RESTORE THIS VECTOR
12033  053140  012767  000000  124424          MOV     #0,SR0                  ;TURN OFF MM AND 22 BITS
12034  053146  012767  000000  117342          MOV     #0,SR3
12035  053154  000167  000106                  JMP     BDVTST
12036
12037
12038                                          ;*************************************************************************
12039
12040  053160  012737  000011  001002  ERRORB: MOV     #11,@#$FATAL
12041  053166  012767  000001  125604          MOV     #1,$MSGTY
12042  053174  032737  000001  001020          BIT     #1,@#$ENV
12043  053202  001004                          BNE     Q22HLT
12044  053204  012700  053216                  MOV     #Q22MSG,R0
12045  053210  004767  060114                  JSR     PC,TYPE
12046  053214  000777                  Q22HLT: BR      .
12047  053216  040506  046111  051125  Q22MSG: .ASCIZ  /FAILURE DURING Q BUS EXERCISER TESTS/<12><15>
12048  053224  020105  052504  044522
12049  053232  043516  050440  041040
12050  053240  051525  042440  042530
12051  053246  041522  051511  051105
12052  053254  052040  051505  051524
12053  053262  006412     000
12054          053266                   .EVEN
12055
12056                                          ;*************************************************************************
12057
12058
12059
12060                                          ;*****************************************************************
12061                                          ;
12062                                          ;       BDV TESTS
12063                                          ;
12064                                          ;
12065                                          ;*****************************************************************
12066
12067                                          ;*************************************************************************************
12068                                          ;TEST 430       TEST FOR FUNCTIONALITY OF R/W REGISTER
12069                                          ;*************************************************************************************
12070  053266                          TS430:
12071
12072
12073
12074  053266  012767  000017  124230  BDVTST: MOV     #17,LSREG               ;TURN OFF THE 4 LEDS
12075  053274  012737  000012  001004          MOV     #12,@#$TESTN            ;TST NUMBER FOR APT
12076  053302  012737  054532  000030          MOV     #ERRORD,@#30            ;ERROR TRAP
12077  053310  000244                          CLZ
12078  053312  032777  002000  146064          BIT     #BIT10,@SWR             ;WANT TO TEST E102 ?
12079  053320  001410                          BEQ     ESR10                   ;NO
12080  053322  016767  124176  175176          MOV     LSREG,TMP               ;RD THIS TO GET SWITCHES
12081  053330  026727  175172  000113          CMP     TMP,#113                ;SHOULD BE THIS VALUE
12082  053336  001401                          BEQ     ESR10                   ;EQUAL
12083  053340  104000                          EMT
```

```
12084  053342  012737  054436  000030  ESR10:  MOV     #ERRORC,@#30            ;ERROR TRAP
12085  053350  005067  124146                  CLR     RWREG           ;THE NEXT FEW INSTRUCTIONS
12086  053354  016701  124142                  MOV     RWREG,R1                ;WILL TEST THE R/W ABILITY
12087  053360  020127  000000                  CMP     R1,#0                   ;OF THE R/W MAINT. REGISTER
12088  053364  001401                          BEQ     ESR40
12089  053366  104000                          EMT
12090  053370  012767  177777  124124  ESR40:  MOV     #-1,RWREG
12091  053376  016701  124120                  MOV     RWREG,R1
12092  053402  022701  177777                  CMP     #177777,R1
12093  053406  001401                          BEQ     ESR41
12094  053410  104000                          EMT
12095  053412  012767  125252  124102  ESR41:  MOV     #125252,RWREG
12096  053420  016701  124076                  MOV     RWREG,R1
12097  053424  020127  125252                  CMP     R1,#125252
12098  053430  001401                          BEQ     ESR42
12099  053432  104000                          EMT
12100  053434  105067  124062          ESR42:  CLRB    RWREG                   ;BYTES
12101  053440  016701  124056                  MOV     RWREG,R1
12102  053444  020127  125000                  CMP     R1,#125000
12103  053450  001401                          BEQ     ESR43
12104  053452  104000                          EMT
12105  053454  000367  124042          ESR43:  SWAB    RWREG
12106  053460  016701  124036                  MOV     RWREG,R1
12107  053464  020127  000252                  CMP     R1,#252
12108  053470  001401                          BEQ     ESR44
12109  053472  104000                          EMT
12110  053474  012767  052525  124020  ESR44:  MOV     #52525,RWREG
12111  053502  016701  124014                  MOV     RWREG,R1
12112  053506  020127  052525                  CMP     R1,#52525
12113  053512  001401                          BEQ     ESR45
12114  053514  104000                          EMT
12115  053516                          ESR45:
12116  053516  105067  124001                  CLRB    RWREG+1
12117  053522  016701  123774                  MOV     RWREG,R1
12118  053526  020127  000125                  CMP     R1,#125
12119  053532  001401                          BEQ     ESR46
12120  053534  104000                          EMT
12121  053536  000367  123760          ESR46:  SWAB    RWREG
12122  053542  016701  123754                  MOV     RWREG,R1
12123  053546  020127  052400                  CMP     R1,#52400
12124  053552  001401                          BEQ     ESR47
12125  053554  104000                          EMT
12126  053556  005067  123740          ESR47:  CLR     RWREG
12127  053562  052767  100000  123732          BIS     #BIT15,RWREG            ;SET 15
12128  053570  016701  123726                  MOV     RWREG,R1
12129  053574  020167  123722          ROTLP1: CMP     R1,RWREG                ;ARE THEY THE SAME
12130  053600  001401                          BEQ     ESR48
12131  053602  104000                          EMT
12132  053604  006001                  ESR48:  ROR     R1                      ;NEXT BIT TO THE RIGHT
12133  053606  001403                          BEQ     ESR49
12134  053610  006067  123706                  ROR     RWREG
12135  053614  000767                          BR      ROTLP1                  ;CONTINUE TESTING
12136  053616  012767  177777  123676  ESR49:  MOV     #-1,RWREG
12137  053624  042767  100000  123670          BIC     #BIT15,RWREG
12138  053632  016701  123664                  MOV     RWREG,R1
12139  053636  026701  123660          ROTLP2: CMP     RWREG,R1                ;SAME ?
```

```
12140  053642  001401                BEQ     ESR50                   ;YES
12141  053644  104000                EMT
12142  053646  000261        ESR50:  SEC                             ;SET THE C BIT
12143  053650  006067  123646        ROR     RWREG
12144  053654  006001                ROR     R1
12145  053656  020127  077777        CMP     R1,#77777
12146  053662  001365                BNE     ROTLP2                  ;NOT FINISHED YET
12147  053664  000461                BR      BDVTS2
12148
12149
12150                          ;*****************************************************************************
12151                          ;TEST 431       ROM CHECKSUM TEST
12152                          ;*****************************************************************************
12153  053666                  TS431:
12154
12155                          ;*****************************************************************
12156                          ;
12157                          ;       THE PREVIOUS TEST CHECKED OUT THE ROM R/W REGISTER
12158                          ;       NOW WE WILL TEST THE 2K DIAGNOSTIC ROM FOR THE
12159                          ;       CORRECT CHECKSUM AND CHECKWORD
12160                          ;
12161                          ;*****************************************************************
12162
12163
12164                              ;THE CHECKWORDS CORRESPONDING TO ROM CHIPS #23-045E2 AND #23-046E2 FOLLOW:
12165  053666                  SFPTBL:
12166  053666  017042                  .WORD   17042           ;ROMA: PAGE 0,1
12167  053670  020656                  .WORD   20656           ;ROMB: PAGE 2,3
12168  053672  065162                  .WORD   65162           ;ROMC: PAGE 4,5
12169  053674  161744                  .WORD   161744          ;ROMD: PAGE 6,7
12170  053676  124453                  .WORD   124453          ;ROME: PAGE 10,11
12171  053700  113667                  .WORD   113667          ;ROMF: PAGE 12,13
12172  053702  056040                  .WORD   56040           ;ROMG: PAGE 14,15
12173  053704  044734                  .WORD   44734           ;ROMH: PAGE 16,17
12174
12175                              ;THE CHECKWORDS CORRESPONDING TO ROM CHIPS #23-339E2 AND #23-340E2 FOLLOW:
12176  053706  166020                  .WORD   166020          ;ROMA: PAGE 0,1
12177  053710  020232                  .WORD   20232           ;ROMB: PAGE 2,3
12178  053712  045651                  .WORD   45651           ;ROMC: PAGE 4,5
12179  053714  036474                  .WORD   36474           ;ROMD: PAGE 6,7
12180  053716  066675                  .WORD   66675           ;ROME: PAGE 10,11
12181  053720  163100                  .WORD   163100          ;ROMF: PAGE 12,13
12182  053722  005407                  .WORD   5407            ;ROMG: PAGE 14,15
12183  053724  022243                  .WORD   22243           ;ROMH: PAGE 16,17
12184
12185                              ;THE CHECKWORDS CORRESPONDING TO ROM CHIPS #23-010E2 AND #23-011E2 FOLLOW:
12186  053726  031547                  .WORD   31547           ;ROMA: PAGE 0,1
12187  053730  014036                  .WORD   14036           ;ROMB: PAGE 2,3
12188  053732  065162                  .WORD   65162           ;ROMC: PAGE 4,5
12189  053734  124632                  .WORD   124632          ;ROMD: PAGE 6,7
12190  053736  032040                  .WORD   32040           ;ROME: PAGE 10,11
12191  053740  167124                  .WORD   167124          ;ROMF: PAGE 12,13
12192  053742  155461                  .WORD   155461          ;ROMG: PAGE 14,15
12193  053744  032257                  .WORD   32257           ;ROMH: PAGE 16,17
12194
12195                          ;***** *********************************************************
```

```
12196
12197                                   ;
12198                                   ;       DATA SECTION FOR THE NEXT TEST
12199                                   ;
12200                                   ;*****************************************************************
12201  053746  000000                             VRTPCR: .WORD   0               ;VIRTUAL PAGE CONTROL REGISTER
12202  053750  000000                             BCF:    .WORD   0
12203  053752  000000                             COUNTR: .WORD   0
12204  053754  000001                             ANSR:   .WORD   1
12205  053756  000000                             RFLAG:  .WORD   0
12206  053760  000000                             EXPSUM: .WORD   0
12207  053762  000000                             ACTSUM: .WORD   0
12208
12209                                   ;*************************************************************
12210                                   ;FUNCTIONAL DESCRIPTION:
12211                                   ;SUBROUTINE TO COMPUTE A CHECKSUM IN A ROM/EPROM
12212                                   ;INPUT: CONTENTS OF BCF
12213                                   ;IMPLICIT INPUTS: CONTENTS OF PCR
12214                                   ;OUTPUT: A CHECKSUM VALUE STORED IN LOCATION ACTSUM
12215                                   ;CALLING SEQUENCE: JSR PC,CHKSUM
12216                                   ;*************************************************************
12217  053764  012701  173776           CHKSUM: MOV     #173776,R1              ;STORE THE HIGHEST ADDRESS IN THE ROM
12218  053770  066701  177754                   ADD     BCF,R1                  ;FOR EITHER LOW OR HIGH BYTES
12219  053774  005067  177762                   CLR     ACTSUM                  ;CLEAR LOCATION WHICH WILL HOLD THE CHECKSUM
12220  054000  012702  173000                   MOV     #173000,R2              ;COMPUTE THE LOWEST ADDRESS IN THE ROM
12221  054004  066702  177740                   ADD     BCF,R2                  ;WHERE THE DATA WILL START
12222  054010  111204                   1$:     MOVB    (R2),R4                 ;GET DATA IN BYTES
12223  054012  060467  177744                   ADD     R4,ACTSUM               ;ADD CONTENTS OF EACH LOCATION TO THE CHECKSUM
12224  054016  062702  000002                   ADD     #2,R2                   ;ADJUST ADDRESS
12225  054022  020201                           CMP     R2,R1                   ;COMPARE CURRENT ADDRESS WITH HIGHEST ADDRESS
12226  054024  002771                           BLT     1$                      ;BR IF LESS THAN
12227  054026  000207                           RTS     PC                      ;RETURN
12228
12229
12230                                   ;************************************************ ****************
12231                                   ;TEST TO PERFORM CHECKSUM AND CHECKWORD VERIFICATION ON THE 2K
12232                                   ;OF DIAGNOSTIC ROM. IN UNATTENDED MODE, THE ROM WILL BE ADDRESSED
12233                                   ;FROM 0-2K. IN STAND-ALONE MODE, THE OPERATOR MAY CHANGE THE
12234                                   ;ADDRESS BY RESPONDING TO QUESTIONS GENERATED ON THE FIRST PASS.
12235                                   ;*************************************************************
12236
12237  054030  012767  000400  000352   BDVTS2: MOV     #400,DRLP               ;STORE STARTING ADDRESS
12238  054036  016767  000346  177702           MOV     DRLP,VRTPCR             ;SET UP PCR
12239  054044  016767  177676  123446           MOV     VRTPCR,PCR
12240  054052  012767  000010  177672           MOV     #10,COUNTR              ;SET NUMBER OF CHECKWORDS TO CHECK
12241  054060  012705  053666                   MOV     #SFPTBL,R5              ;LOCATION OF CHECKWORDS
12242  054064  012767  000001  177664           MOV     #1,RFLAG                ;INDICATE ROM
12243  054072  005067  177652           DLOOP:  CLR     BCF                     ;SIGNAL LOW BYTES ARE BEING CHECKED
12244  054076  122737  177777  173774           CMPB    #-1,@#173774            ;DOES THE ROM EXIST?
12245  054104  001001                           BNE     1$                      ;BR IF YES
12246  054106  104000                           EMT
12247  054110  004767  177650           1$:     JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
12248  054114  113767  173776  177636           MOVB    @#173776,EXPSUM         ;GET THE STORED CHECKSUM
12249  054122  066767  177634  177630           ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
12250  054130  105767  177624                   TSTB    EXPSUM                  ;BYTE RESULT = 0?
12251  054134  001401                           BEQ     2$                      ;BR IF YES
```

```
12252  054136  104000                          EMT
12253  054140  012767  000001  177602  2$:     MOV     #1,BCF                  ;SET BCF TO DENOTE HIGH BYTES
12254  054146  122737  177777  173775          CMPB    #-1,@#173775            ;DOES THE ROM EXIST?
12255  054154  001001                          BNE     3$                      ;BR IF YES
12256  054156  104000                          EMT
12257  054160  004767  177600          3$:     JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
12258  054164  113767  173777  177566          MOVB    @#173777,EXPSUM         ;GET EXPECTED CHECKSUM
12259  054172  066767  177564  177560          ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
12260  054200  105767  177554                  TSTB    EXPSUM                  ;BYTE RESULT = 0?
12261  054204  001401                          BEQ     4$                      ;BR IF YES
12262  054206  104000                          EMT
12263  054210  062767  001002  177530  4$:     ADD     #1002,VRTPCR            ;NEXT PAGE IN PCR
12264  054216  016767  177524  123274          MOV     VRTPCR,PCR
12265  054224  005367  177522                  DEC     COUNTR                  ;DECREMENT CHECKWORD COUNT
12266  054230  001320                          BNE     DLOOP                   ;LOOP UNTIL ALL 20 PAGES HAVE BEEN CHECKED
12267
12268
12269                                          ;GET THE CHECKWORDS FROM THE ROMS AND PUT INTO TABLE 'CHKWRD'
12270  054232  012702  054412                  MOV     #CHKWRD,R2
12271  054236  012767  000001  177502          MOV     #1,VRTPCR
12272  054244  012767  000010  177500          MOV     #10,COUNTR
12273  054252  016767  177470  123240  5$:     MOV     VRTPCR,PCR
12274  054260  013722  173376                  MOV     @#173376,(R2)+
12275  054264  062767  000002  177454          ADD     #2,VRTPCR
12276  054272  005367  177454                  DEC     COUNTR
12277  054276  001365                          BNE     5$
12278
12279
12280                                          ;TRY TO IDENTIFY THE ROM CHIPS
12281  054300  016701  000126                  MOV     TABLES,R1
12282  054304  012767  053666  000122          MOV     #SFPTBL,PNTR
12283  054312  016700  000116          SIXDLR: MOV     PNTR,R0
12284  054316  012702  054412                  MOV     #CHKWRD,R2
12285  054322  012767  000010  177422          MOV     #10,COUNTR
12286  054330  022022                  7$:     CMP     (R0)+,(R2)+             ;ARE THE CHECKWORDS EQUAL?
12287  054332  001017                          BNE     NOTEQ                   ;BRANCH IF NOT
12288  054334  005367  177412                  DEC     COUNTR                  ;DONE CHECKING THIS TABLE?
12289  054340  001373                          BNE     7$                      ;BRANCH IF NOT
12290  054342  020127  000003                  CMP     R1,#3           ;DID THE FIRST TABLE OF CHECKWORDS COMPARE?
12291  054346  001001                          BNE     8$              ;BRANCH IF NOT
12292  054350  000416                          BR      COMPLE
12293  054352  020127  000002          8$:     CMP     R1,#2           ;DID THE SECOND TABLE OF CHECKWORDS COMPARE?
12294  054356  001001                          BNE     NOCMP           ;BRANCH IF NOT
12295  054360  000412                          BR      COMPLE
12296  054362  020127  000001          NOCMP:  CMP     R1,#1
12297  054366  001001                          BNE     NOTEQ
12298  054370  000406                          BR      COMPLE
12299  054372  062767  000020  000034  NOTEQ:  ADD     #20,PNTR
12300  054400  005301                          DEC     R1                      ;ANY MORE TABLES TO CHECK?
12301  054402  001343                          BNE     SIXDLR                  ;BRANCH IF YES
12302  054404  104000                          EMT
12303  054406  000515                  COMPLE: BR      FPSTRT
12304
12305
12306
12307
```

```
12308  054410  000000                    DRLP:   .WORD   0
12309
12310
12311  054412  000010                    CHKWRD: .BLKW   10              ;TABLE TO STORE THE CHECKWORDS
12312
12313  054432  000003                    TABLES: .WORD   3               ;NUMBER OF CHECKWORD TABLES
12314  054434  000000                    PNTR:   .WORD   0               ;WILL BE USED AS A POINTER
12315
12316                                    ;*****************************************************************
12317                                    ;
12318                                    ;       ERROR ROUTINE FOR THE BDV TESTING
12319                                    ;
12320                                    ;*****************************************************************
12321
12322  054436  012737  000012  001002  ERRORC: MOV     #12,@#$FATAL
12323  054444  012767  000001  124326          MOV     #1,$MSGTY
12324  054452  032737  000001  001020          BIT     #1,@#$ENV                       ;UNDER APT ?
12325  054460  001004                          BNE     BDVHLT
12326  054462  012700  054474                  MOV     #BDVMSG,R0
12327  054466  004767  056636                  JSR     PC,TYPE
12328  054472  000777                  BDVHLT: BR      .
12329
12330  054474  040506  046111  042105  BDVMSG: .ASCIZ  /FAILED DURING THE BDV TESTS/<12><15>
12331  054502  042040  051125  047111
12332  054510  020107  044124  020105
12333  054516  042102  020126  042524
12334  054524  052123  005123  000015
12335
12336
12337  054532  012737  000012  001002  ERRORD: MOV     #12,@#$FATAL
12338  054540  012767  000001  124232          MOV     #1,$MSGTY
12339  054546  032737  000001  001020          BIT     #1,@#$ENV
12340  054554  001346                          BNE     BDVHLT
12341  054556  012700  054570                  MOV     #SWMSG,R0
12342  054562  004767  056542                  JSR     PC,TYPE
12343  054566  000000                          HALT
12344  054570  044103  041505  020113  SWMSG:  .ASCIZ  /CHECK SWITCHES ON E102, RESTART AT 200/<12><15>
12345  054576  053523  052111  044103
12346  054604  051505  047440  020116
12347  054612  030505  031060  020054
12348  054620  042522  052123  051101
12349  054626  020124  052101  031040
12350  054634  030060  006412     000
12351          054642                  .EVEN
12352
12353                                    ;* *****************************************************************
12354
12355
12356
12357
12358
12359
12360
12361
12362          000244                  FPVECT=244
12363                                          .SBTTL  FPP REGISTER DEFINITIONS
```

```
12364            000000                  AC0     =%0
12365            000001                  AC1     =%1
12366            000002                  AC2     =%2
12367            000003                  AC3     =%3
12368            000004                  AC4     =%4
12369            000005                  AC5     =%5
12370            000006                  AC6     =%6
12371            000007                  AC7     =%7
12372
12373
12374  054642    012706  001000          FPSTRT: MOV     #STBOT,SP       ;SET UP STACK POINTER
12375  054646    000244                  CLZ
12376  054650    032777  000002  144526          BIT     #2,@SWR
12377  054656    001002                  BNE     1$
12378  054660    000167  047772                  JMP     SLU1ST
12379  054664    012737  124476  000030  1$:     MOV     #ERROR4,@#30    ;SETUP FOR CORRECT ERROR CALL
12380  054672    012737  000003  001004          MOV     #3,@#$TESTN     ;PUT TEST NUMBER IN MAILBOX
12381
12382
12383                                    ;*****************************************************************************************
12384                                    ;TEST 432       LDFPS, STFPS AND DATA PATHS TEST
12385                                    ;*****************************************************************************************
12386  054700                            TS432:
12387  054700    012700  177777                  MOV     #-1,R0                  ;INITIALIZE THE COUNT PATTERN.
12388  054704    012737  054756  000244          MOV     #AERR1,@#FPVECT         ;SET UP FOR UNABLE TO DECODE
12389  054712    012737  054756  000010          MOV     #AERR1,@#10             ;FPP INSTRUCTION TRAP TO 244 OR 10.
12390  054720    012737  054756  000004          MOV     #AERR1,@#ERRVECT        ;IF EITHER INSTRUCTION
12391                                                                            ;FAILS TO GO THROUGH THE
12392                                                                            ;CORRECT SRC OR DST MODE AN
12393                                                                            ;ODD ADDRESS TRAP WILL OCCUR.
12394  054726                            A1:
12395  054726    010004                  A11:    MOV     R0,R4
12396  054730    042704  030020                  BIC     #30020,R4
12397  054734    170104                          LDFPS   R4                      ;TEST INSTRUCTION.
12398
12399  054736    012701  177777                  MOV     #-1,R1
12400  054742    170201                  A12:    STFPS   R1                      ;TEST INSTRUCTION.
12401  054744    010004                          MOV     R0,R4                   ;MASK OFF UNSETTABLE BITS.
12402  054746    042704  030020                  BIC     #30020,R4
12403  054752    020401                          CMP     R4,R1                   ;COMPARE DATA EXPECTED WITH
12404                                                                            ;THE DATA READ.
12405  054754    001401                          BEQ     A2
12406  054756                            AERR1:
12407  054756    104000                          EMT                     ;
12408
12409  054760    012700  000001          A2:     MOV     #1,R0                   ;NEXT PATTERN WILL BE ALL ZERO
12410  054764    077020                          SOB     R0,A1                   ;DECREMENT COUNT PATTERN
12411  054766                            ADONE:
12412  054766    004767  047600                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
12413                                                                    ;SEE IF THE USER HAS EXPRESSED
12414                                                                    ;THE DESIRE TO CHANGE THE SOFTWARE
12415                                                                    ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12416                                                                    ;THE USER TYPED CONTROL G?).
12417
12418
12419                                    ;*****************************************************************************************
```

```
12420
12421
12422  054772
12423  054772  012700  000017          ;TEST 433       CFCC TEST
12424                                  ;*****************************************************************************
12425  054776                          TS433:
12426  054776  170100                          MOV     #17,R0                  ;R0 CONTAINS TO TEST PATTERN.
12427
12428  055000                          B1:
12429  055000  170000                          LDFPS   R0                      ;LOAD THE TEST PATTERN
12430
12431  055002  013703  177776          B2:     CFCC                            ;COPY CONDITION CODES.
12432  055006  042703  177760                  MOV     @#PSW,R3                ;SEE IF PATTERN TRANSFERED.
12433  055012  020003                          BIC     #177760,R3
12434  055014  001401                          CMP     R0,R3
12435  055016  104000                          BEQ     B3
12436  055020  077012                          EMT                     ;
12437  055022                          B3:     SOB     R0,B1
12438  055022  004767  047544          BDONE:  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
12439                                                                  ;SEE IF THE USER HAS EXPRESSED
12440                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
12441                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12442                                                                  ;THE USER TYPED CONTROL G?).
12443
12444                                  ;*****************************************************************************
12445                                  ;TEST 434       SETF, SETD, SETI AND SETL TEST
12446                                  ;*****************************************************************************
12447  055026                          TS434:
12448  055026  005000                          CLR     R0
12449
12450  055030  170100                          LDFPS   R0                      ;CLEAR THE FPS.
12451  055032  170001          C15:    SETF                                    ;TEST INSTRUCTION.
12452
12453  055034  170201                          STFPS   R1                      ;GET RESULT.
12454  055036  005002                          CLR     R2
12455  055040  020201                          CMP     R2,R1                   ;DID AN ERROR OCCUR
12456  055042  001401                          BEQ     C2
12457  055044  104000                          EMT                     ;
12458  055046  012700  147757  C2:     MOV     #147757,R0
12459
12460  055052  170100                          LDFPS   R0                      ;PUT 147757 IS FPS
12461  055054  170001          C25:    SETF                                    ;CLEAR FD BIT.
12462
12463  055056  170201                          STFPS   R1                      ;GET RESULT
12464  055060  012702  147557                  MOV     #147557,R2
12465  055064  020102                          CMP     R1,R2                   ;RESULT CORRECT.
12466  055066  001401                          BEQ     C3
12467  055070  104000                          EMT                     ;
12468  055072  012700  147757  C3:     MOV     #147757,R0
12469
12470  055076  170100                          LDFPS   R0                      ;LOAD 147757 INTO FPS.
12471  055100  170011          C35:    SETD                                    ;SETD FD BIT.
12472
12473  055102  170201                          STFPS   R1
12474  055104  012702  147757                  MOV     #147757,R2
12475  055110  020102                          CMP     R1,R2                   ;RESULT CORRECT?
```

```
12476  055112  001401                  BEQ     C4
12477  055114  104000                  EMT                     ;
12478  055116  005000          C4:     CLR     R0
12479  055120  170100                  LDFPS   R0                      ;CLEAR FPS.
12480  055122  170011          C45:    SETD                            ;SET FD BIT.
12481
12482  055124  170201                  STFPS   R1                      ;GET RESULT.
12483  055126  012702  000200        MOV     #200,R2
12484  055132  020102                  CMP     R1,R2                   ;RESULT CORRECT?
12485  055134  001401                  BEQ     C5
12486  055136  104000                  EMT                     ;
12487  055140  005000          C5:     CLR     R0
12488
12489  055142  170100                  LDFPS   R0                      ;CLEAR FPS
12490  055144  170002          C55:    SETI                            ;CLEAR FL BIT.
12491
12492  055146  170201                  STFPS   R1                      ;GET RESULT.
12493  055150  005002                  CLR     R2
12494  055152  020201                  CMP     R2,R1                   ;RESULT CORRECT?
12495  055154  001401                  BEQ     C6
12496  055156  104000                  EMT                     ;
12497  055160  012700  147757  C6:     MOV     #147757,R0
12498  055164  170100                  LDFPS   R0                      ;PUT 147757 INTO FPS
12499  055166  170002          C65:    SETI                            ;CLEAR FL BIT.
12500
12501  055170  170201                  STFPS   R1                      ;GET THE RESULT.
12502  055172  012702  147657        MOV     #147657,R2
12503  055176  020102                  CMP     R1,R2                   ;RESULT CORRECT?
12504  055200  001401                  BEQ     C7
12505  055202  104000                  EMT                     ;
12506  055204  012700  147757  C7:     MOV     #147757,R0
12507  055210  170100                  LDFPS   R0                      ;SET FPS TO 147757.
12508  055212  170012          C75:    SETL                            ;SET FL BIT.
12509
12510  055214  170201                  STFPS   R1                      ;GET THE RESULT.
12511  055216  012702  147757        MOV     #147757,R2
12512  055222  020102                  CMP     R1,R2                   ;RESULT CORRECT?
12513  055224  001401                  BEQ     C8
12514  055226  104000                  EMT                     ;
12515  055230  005000          C8:     CLR     R0
12516  055232  170100                  LDFPS   R0                      ;CLEAR FPS.
12517  055234  170012          C85:    SETL                            ;SET FL BIT.
12518
12519  055236  170201                  STFPS   R1
12520  055240  012702  000100        MOV     #100,R2
12521  055244  020102                  CMP     R1,R2                   ;RESULT CORRECT.
12522  055246  001401                  BEQ     CDONE
12523  055250  104000                  EMT                     ;
12524  055252          CDONE:
12525  055252  004767  047314          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
12526                                  ;SEE IF THE USER HAS EXPRESSED
12527                                  ;THE DESIRE TO CHANGE THE SOFTWARE
12528                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12529                                  ;THE USER TYPED CONTROL G?).
12530
12531
```

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12532                                   ;*****************************************************************************
12533                                   ;TEST 435       ILLEGAL FPP OP CODES AND STST TEST
12534                                   ;*****************************************************************************
12535  055256                           TS435:
12536  055256  012705  170003                  MOV     #170003,R5              ;INITIAL OP CODE.
12537  055262  012737  055322  000004          MOV     #DERR2,@#ERRVECT
12538  055270  012737  055354  000244          MOV     #DERR1,@#FPVECT
12539
12540  055276  005000                   D1:     CLR     R0
12541  055300  170100                          LDFPS   R0                      ;CLEAR FPS.
12542  055302  005002                          CLR     R2
12543  055304  010537  055310                  MOV     R5,@#D2                 ;SET UP THE ILLEGAL INSTRUCTION.
12544  055310  000000                   D2:     .WORD   0
12545  055312  170000                   D3:     CFCC
12546  055314  005202                          INC     R2
12547  055316  005202                   D4:     INC     R2
12548
12549  055320  170201                          STFPS   R1                      ;REPORT FAILURE. DID NOT TRAP.
12550  055322                           DERR2:
12551  055322  104000                          EMT                     ;
12552  055324  022705  170010           D5:     CMP     #170010,R5              ;COMPUTE NEXT OP CODE
12553  055330  001003                          BNE     D6
12554  055332  012705  170013                  MOV     #170013,R5
12555  055336  000757                          BR      D1
12556
12557  055340  022705  170077           D6:     CMP     #170077,R5
12558  055344  001001                          BNE     D7
12559  055346  000424                          BR      DDONE
12560  055350  005205                   D7:     INC     R5
12561  055352  000751                          BR      D1
12562
12563  055354  022716  055312           DERR1:  CMP     #D3,(SP)                ;DID TRAP OCCUR ON TEST INSTRUCTION?
12564  055360  001401                          BEQ     1$
12565  055362  104000                          EMT                     ;
12566  055364  022626                   1$:     CMP     (SP)+,(SP)+
12567  055366  170201                          STFPS   R1                      ;GET THE FPS AND SEE IF IT IS
12568  055370  022701  100000                  CMP     #100000,R1              ;SET CORRECTLY.
12569  055374  001401                          BEQ     3$
12570  055376  104000                          EMT                     ;
12571  055400  012704  000001           3$:     MOV     #1,R4
12572  055404  170304                   D8:     STST    R4                      ;GET THE FEC CODE. NOTE THAT
12573                                           ;IF THE DESTINATION MODE IS
12574                                           ;IMPROPERLY DECODED AN ODD
12575                                           ;ADDRESS TRAP TO 4 SHOULD OCCUR.
12576  055406  022704  000002                  CMP     #2,R4                   ;WAS FEC CORRECT?
12577  055412  001001                          BNE     D9
12578  055414  000743                          BR      D5
12579
12580  055416                           D9:                                     ;REPORT STST FAILURE
12581  055416  104000                          EMT                     ;
12582  055420                           DDONE:
12583  055420  004767  047146                  JSR     PC,.RSET                ;GO INITIALIZE THE FPS AND STACK; AND
12584                                           ;SEE IF THE USER HAS EXPRESSED
12585                                           ;THE DESIRE TO CHANGE THE SOFTWARE
12586                                           ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12587                                           ;THE USER TYPED CONTROL G?).
```

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12588
12589                                   ;*****************************************************************************
12590                                   ;TEST 436       FID, INTERRUPT DISABLE, BIT TEST
12591                                   ;*****************************************************************************
12592  055424                           TS436:
12593  055424  012737  055464  000244          MOV     #EERR0,@#FPVECT         ;SETUP FOR THE INTERRUPT.
12594
12595  055432  012700  040000          E1:     MOV     #40000,R0
12596  055436  170100                          LDFPS   R0                      ;SET FID.
12597  055440  170020                  E3:     .WORD   170020                  ;ILLEGAL FPP INSTRUCTION.
12598  055442  170000                  E4:     CFCC
12599
12600  055444  170201                          STFPS   R1                      ;SEE IF ERROR WAS DETECTED.
12601  055446  022701  140000                  CMP     #140000,R1
12602  055452  001004                          BNE     EERR0
12603
12604  055454  170304                          STST    R4                      ;SEE IF FEC=2
12605  055456  022704  000002                  CMP     #2,R4
12606  055462  001401                          BEQ     EDONE
12607  055464                          EERR0:
12608  055464  104000                          EMT                     ;
12609  055466                          EDONE:
12610  055466  004767  047100                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
12611                                                                  ;SEE IF THE USER HAS EXPRESSED
12612                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
12613                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12614                                                                  ;THE USER TYPED CONTROL G?).
12615
12616
12617                                   ;*****************************************************************************
12618                                   ;TEST 437       LDD AND STD, WITH SRC AND DST MODE 1, TEST
12619                                   ;*****************************************************************************
12620  055472                           TS437:
12621
12622  055472  005000                          CLR     R0
12623  055474  170100                          LDFPS   R0
12624  055476  170011                          SETD
12625  055500  012701  055742                  MOV     #FDATI0,R1              ;SET UP THE LOAD DATA.
12626  055504  012702  056006                  MOV     #FXDAT0,R2
12627  055510  012703  000010                  MOV     #10,R3
12628
12629  055514  012221                  F2:     MOV     (R2)+,(R1)+
12630  055516  077302                          SOB     R3,F2
12631
12632  055520  012700  055752                  MOV     #FDATI4,R0              ;SETUP R0 FOR THE LDD (R0),AC0.
12633  055524  012737  055740  000004          MOV     #FERR20,@#ERRVECT       ;IF THE SRC FLOWS FAIL THEN
12634                                                                          ;AN ODD ADDRESS MAY OCCUR.
12635  055532  005003                          CLR     R3
12636
12637  055534  172410                  F3:     LDD     (R0),AC0
12638  055536  005203                  F4:     INC     R3
12639  055540  005203                          INC     R3
12640
12641  055542  020027  055752                  CMP     R0,#FDATI4              ;WAS R0 AFFECTED?
12642  055546  001401                          BEQ     F5
12643  055550  104000                          EMT                     ;
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12644  055552  020327  000002          F5:     CMP     R3,#2                   ;SEE IF THE PC WAS ADVERSELY
12645  055556  001401                          BEQ     1$
12646  055560  104000                          EMT                     ;
12647  055562  012701  055742          1$:     MOV     #FDATI0,R1              ;MAKE SURE THE SOURCE DATA WAS
12648  055566  012702  056006                  MOV     #FXDAT0,R2              ;NOT AFFECTED.
12649  055572  012703  000010                  MOV     #10,R3
12650  055576  022122                  2$:     CMP     (R1)+,(R2)+
12651  055600  001401                          BEQ     3$
12652  055602  104000                          EMT                     ;
12653  055604  077304                  3$:     SOB     R3,2$
12654
12655  055606  170201                          STFPS   R1                      ;MAKE SURE THE FPS IS CORRECT.
12656  055610  022701  000200                  CMP     #200,R1
12657  055614  001401                          BEQ     F6
12658  055616  104000                          EMT                     ;
12659  055620  012703  177777          F6:     MOV     #-1,R3
12660  055624  012704  000010                  MOV     #10,R4
12661  055630  012705  055764                  MOV     #FDAT00,R5              ;SET UP THE OUTPUT DATA BUFFER.
12662  055634  010325                  F7:     MOV     R3,(R5)+
12663  055636  077402                          SOB     R4,F7
12664
12665  055640  012700  055774                  MOV     #FDAT04,R0              ;SET UP R0 FOR DST MODE 1 REG 0.
12666  055644  012737  055740  000004          MOV     #FERR20,@#ERRVECT       ;IF THE DST FLOWS FAIL AN ODD
12667                                                                          ;ADDRESS COULD OCCUR.
12668  055652  005003                          CLR     R3
12669
12670  055654  174010                  F10:    STD     AC0,(R0)                ;TEST INSTRUCTION.
12671  055656  005203                  F11:    INC     R3
12672  055660  005203                          INC     R3
12673
12674  055662  020027  055774                  CMP     R0,#FDAT04                      ;WAS R0 MODIFIED?
12675  055666  001401                          BEQ     F12
12676  055670  104000                          EMT                     ;
12677  055672  020327  000002          F12:    CMP     R3,#2                   ;WAS THE PC AFFECTED CORRECTLY?
12678  055676  001401                          BEQ     F135
12679  055700  104000                          EMT                     ;
12680  055702  012701  055764          F135:   MOV     #FDAT00,R1
12681  055706  012702  056006                  MOV     #FXDAT0,R2
12682  055712  012703  000010                  MOV     #10,R3          ;SETUP LOOP COUNT
12683  055716  022122                  F13:    CMP     (R1)+,(R2)+     ;WAS DATA OUTPUT CORRECTLY
12684  055720  001401                          BEQ     F14
12685  055722  104000                          EMT                     ;
12686  055724  077304                  F14:    SOB     R3,F13          ;SUBTRACT 1 FROM LOOP COUNT AND LOOP IF NOT ZERO
12687  055726  005001                  F22:    CLR     R1
12688  055730  170201                          STFPS   R1                      ;MAKE SURE FPS IS CORRECT.
12689  055732  022701  000200                  CMP     #200,R1
12690  055736  001433                          BEQ     FDONE
12691  055740                          FERR20:
12692  055740  104000                          EMT                     ;
12693
12694  055742  177777          FDATI0: -1
12695  055744  177777          FDATI1: -1
12696  055746  177777          FDATI2: -1
12697  055750  177777          FDATI3: -1
12698  055752  177777          FDATI4: -1
12699  055754  177777          FDATI5: -1
```

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12700  055756  177777                  FDATI6: -1
12701  055760  177777                  FDATI7: -1
12702  055762  177777                          -1
12703  055764  177777                  FDATO0: -1
12704  055766  177777                  FDATO1: -1
12705  055770  177777                  FDATO2: -1
12706  055772  177777                  FDATO3: -1
12707  055774  177777                  FDATO4: -1
12708  055776  177777                  FDATO5: -1
12709  056000  177777                  FDATO6: -1
12710  056002  177777                  FDATO7: -1
12711  056004  177777                          -1
12712  056006  177777                  FXDAT0: -1
12713  056010  177777                  FXDAT1: -1
12714  056012  177777                  FXDAT2: -1
12715  056014  177777                  FXDAT3: -1
12716  056016  052525                  FXDAT4: 052525
12717  056020  031463                  FXDAT5: 031463
12718  056022  007417                  FXDAT6: 007417
12719  056024  000477                  FXDAT7: 000477
12720
12721
12722  056026                          FDONE:
12723  056026  004767  046540                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
12724                                                                  ;SEE IF THE USER HAS EXPRESSED
12725                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
12726                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12727                                                                  ;THE USER TYPED CONTROL G?).
12728
12729
12730                                  ;*****************************************************************************
12731                                  ;TEST 440       FSRC MODE 0 TEST
12732                                  ;*****************************************************************************
12733  056032                          TS440:
12734  056032                          I1:
12735  056032  170011                          SETD                    ;SET FD.
12736  056034  012700  056320                  MOV     #IDATI0,R0
12737  056040  012701  056270                  MOV     #IPATI0,R1
12738  056044  012702  000004                  MOV     #4,R2
12739  056050  012120                  I2:     MOV     (R1)+,(R0)+     ;SET UP THE INPUT DATA BUFFER.
12740  056052  077202                          SOB     R2,I2
12741
12742  056054  012700  056320                  MOV     #IDATI0,R0      ;LOAD AC1
12743  056060  172510                          LDD     (R0),AC1
12744
12745  056062  012700  056300                  MOV     #IPAT20,R0      ;LOAD AC0
12746  056066  172410                          LDD     (R0),AC0
12747
12748  056070  012701  000001                  MOV     #1,R1           ;IN CASE THE FSRC FLOWS FAIL
12749  056074  172401                  I3:     LDD     AC1,AC0         ;TEST INSTRUCTION.
12750  056076  000240                  I4:     NOP
12751  056100  000240                  I5:     NOP
12752
12753  056102  012700  056310                  MOV     #IDATO0,R0
12754  056106  174010                          STD     AC0,(R0)        ;GET AC0, THE RESULTS.
12755
```

```
12756  056110  012700  056310          MOV     #IDAT00,R0              ;SEE IF DATA IS CORRECT.
12757  056114  012701  056320          MOV     #IDAT10,R1
12758  056120  012702  000004          MOV     #4,R2
12759  056124  022021                  I6:     CMP     (R0)+,(R1)+
12760  056126  001401                          BEQ     I105
12761  056130  104000                          EMT                     ;
12762  056132  077204                  I105:   SOB     R2,I6
12763
12764                                   ;NOW TEST THE LOAD INSTRUCTION WITH FSRC MODE ZERO AND FD CLEAR.
12765
12766  056134  012700  056270          I12:    MOV     #IPAT10,R0
12767  056140  012701  056320                  MOV     #IDAT10,R1
12768  056144  012702  000004                  MOV     #4,R2
12769  056150  012021                  I13:    MOV     (R0)+,(R1)+
12770  056152  077202                          SOB     R2,I13
12771
12772  056154  012700  056320                  MOV     #IDAT10,R0              ;SET UP AC1
12773  056160  172510                          LDD     (R0),AC1
12774
12775  056162  012700  056300                  MOV     #IPAT20,R0              ;SET UP AC0
12776  056166  172410                          LDD     (R0),AC0
12777
12778  056170  012701  000001                  MOV     #1,R1
12779  056174  170001                          SETF                            ;CLEAR FD.
12780
12781  056176  172401                  I14:    LDF     AC1,AC0                 ;TEST INSTRUCTION.
12782  056200  000240                  I15:    NOP
12783  056202  000240                  I16:    NOP
12784
12785  056204  170200                          STFPS   R0                      ;SEE IF FPS IS STILL CLEAR.
12786  056206  022700  000004                  CMP     #4,R0
12787  056212  001401                          BEQ     I17
12788  056214  104000                          EMT                     ;
12789  056216                          I17:                            ;RESET TO DOUBLE MODE.
12790  056216  170011                          SETD
12791
12792  056220  012700  056310                  MOV     #IDAT00,R0
12793  056224  174010                          STD     AC0,(R0)                ;GET AC0
12794
12795  056226  012737  177777  056324          MOV     #-1,@#IDAT12
12796  056234  012737  177777  056326          MOV     #-1,@#IDAT13
12797  056242  012700  056310                  MOV     #IDAT00,R0
12798  056246  012701  056320                  MOV     #IDAT10,R1
12799  056252  012702  000004                  MOV     #4,R2
12800  056256  022021                  I20:    CMP     (R0)+,(R1)+             ;SEE IF AC0 WAS CORRECT.
12801  056260  001401                          BEQ     I23
12802  056262  104000                          EMT                     ;
12803  056264  077204                  I23:    SOB     R2,I20
12804  056266  000420                          BR      IDONE                   ;NO ERRORS.
12805
12806  056270  000000                  IPAT10: 0
12807  056272  170360                  IPAT11: 170360
12808  056274  016161                  IPAT12: 016161
12809  056276  052525                  IPAT13: 052525
12810
12811  056300  177777                  IPAT20: -1
```

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12812  056302  177777                  IPAT21: -1
12813  056304  177777                  IPAT22: -1
12814  056306  177777                  IPAT23: -1
12815
12816  056310  000000                  IDAT00: 0
12817  056312  000000                  IDAT01: 0
12818  056314  000000                  IDAT02: 0
12819  056316  000000                  IDAT03: 0
12820
12821  056320  000000                  IDAT10: 0
12822  056322  000000                  IDAT11: 0
12823  056324  000000                  IDAT12: 0
12824  056326  000000                  IDAT13: 0
12825
12826  056330                          IDONE:
12827  056330  004767  046236                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
12828                                                                  ;SEE IF THE USER HAS EXPRESSED
12829                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
12830                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12831                                                                  ;THE USER TYPED CONTROL G?).
12832
12833
12834                                  ;*****************************************************************************
12835                                  ;TEST 441       FDST MODE 0 TEST
12836                                  ;*****************************************************************************
12837  056334                          TS441:
12838  056334  170011                          SETD                            ;SET FD
12839  056336  012700  056574                  MOV     #TPAT10,R0
12840  056342  012701  056624                  MOV     #TDAT10,R1
```

```
 12841  056346  012702  000004                MOV     #4,R2
```

```
12842  056352  012021  T2:     MOV     (R0)+,(R1)+          ;SET UP THE INPUT DATA BUFFER.
12843  056354  077202          SOB     R2,T2
12844
```

```
12845  056356  012700  056624          MOV     #TDATI0,R0              ;LOAD AC0
12846  056362  172410                  LDD     (R0),AC0
12847
12848  056364  012700  056604          MOV     #TPAT20,R0              ;LOAD AC1
12849  056370  172510                  LDD     (R0),AC1
12850
12851  056372  012701  000001          MOV     #1,R1                   ;IF THE (BUT FDST) FORK FAILS
12852  056376  174001          T3:     STD     AC0,AC1
12853  056400  000240          T4:     NOP
12854  056402  000240          T5:     NOP
12855
12856  056404  012700  056614          MOV     #TDAT00,R0
12857  056410  174110                  STD     AC1,(R0)                ;GET THE DATA.
12858
12859  056412  012703  056614          MOV     #TDAT00,R3              ;SEE IF THE DATA IS CORRECT.
12860  056416  012704  056624          MOV     #TDATI0,R4
12861  056422  012705  000004          MOV     #4,R5
12862  056426  022324          T6:     CMP     (R3)+,(R4)+
12863  056430  001401                  BEQ     T105
12864  056432  104000                  EMT                             ;
12865  056434  077504          T105:   SOB     R5,T6
12866
12867                                  ;NOW TEST THE STF AC0,AC1 INSTRUCTION.
12868
12869  056436  012700  056574  T12:    MOV     #TPAT10,R0              ;SET UP THE INPUT DATA BUFFER.
12870  056442  012701  056624          MOV     #TDATI0,R1
12871  056446  012702  000004          MOV     #4,R2
12872  056452  012021          T13:    MOV     (R0)+,(R1)+
12873  056454  077202                  SOB     R2,T13
12874
12875  056456  012700  056624          MOV     #TDATI0,R0              ;SET UP AC0
12876  056462  172410                  LDD     (R0),AC0
12877
12878  056464  012700  056604          MOV     #TPAT20,R0              ;SET UP AC1
12879  056470  172510                  LDD     (R0),AC1
12880
12881  056472  012701  000001          MOV     #1,R1
12882  056476  170001                  SETF                            ;CLEAR FD
12883  056500  174001          T14:    STF     AC0,AC1
12884  056502  000240          T15:    NOP
12885  056504  000240          T16:    NOP
12886
12887  056506  005000                  CLR     R0
12888  056510  170200                  STFPS   R0                      ;SEE IF FPS IS CLEAR.
12889  056512  022700  000010          CMP     #10,R0
12890  056516  001401                  BEQ     T17
12891  056520  104000                  EMT                             ;
12892  056522          T17:
12893  056522  170011                  SETD                            ;SET FD.
12894
12895  056524  012700  056614          MOV     #TDAT00,R0
12896  056530  174110                  STD     AC1,(R0)                ;PICK UP AC1.
12897
12898  056532  012737  177777  056630  MOV     #-1,@#TDATI2
12899  056540  012737  177777  056632  MOV     #-1,@#TDATI3
12900  056546  012703  056614          MOV     #TDAT00,R3
```

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12901  056552  012704  056624          MOV     #TDATI0,R4
12902  056556  012705  000004          MOV     #4,R5
12903  056562  022324          T20:    CMP     (R3)+,(R4)+             ;WAS THE DATA TRANSFERRED CORRECTLY?
12904  056564  001401                  BEQ     T23
12905  056566  104000                  EMT                             ;
12906  056570  077504          T23:    SOB     R5,T20
12907  056572  000420                  BR      TDONE
12908
12909
12910  056574  000000          TPAT10: 0
12911  056576  170360          TPAT11: 170360
12912  056600  016161          TPAT12: 016161
12913  056602  052525          TPAT13: 052525
12914
12915  056604  177777          TPAT20: -1
12916  056606  177777          TPAT21: -1
12917  056610  177777          TPAT22: -1
12918  056612  177777          TPAT23: -1
12919
12920  056614  000000          TDAT00: 0
12921  056616  000000          TDAT01: 0
12922  056620  000000          TDAT02: 0
12923  056622  000000          TDAT03: 0
12924
12925  056624  000000          TDATI0: 0
12926  056626  000000          TDATI1: 0
12927  056630  000000          TDATI2: 0
12928  056632  000000          TDATI3: 0
12929
12930  056634                  TDONE:
12931  056634  004767  045732          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
12932                                                          ;SEE IF THE USER HAS EXPRESSED
12933                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
12934                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12935                                                          ;THE USER TYPED CONTROL G?).
12936
12937
12938
12939                           ;*************************************************************************************
12940                           ;TEST 442       ACCUMULATORS DATA PATTERNS TEST
12941                           ;*************************************************************************************
12942  056640                  TS442:
12943  056640  170011                  SETD                            ;SET FD.
12944                          ;TEST ACCUMULATOR 0 WITH FLOATING ONE
12945  056642  012700  060374          MOV     #GPAT00,R0
12946  056646  012701  060434          MOV     #GDAT00,R1
12947  056652  004737  060246          JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
12948  056656  012703  000102          MOV     #102,R3
12949  056662                  G1:
12950  056662  172410                  LDD     (R0),AC0
12951  056664  174000                  STD     AC0,AC0
12952  056666  172400                  LDD     AC0,AC0         ;STORE THE TEST PATTERN.
12953  056670  174011                  STD     AC0,(R1)
12954  056672  004737  060344          JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
12955                                                          ;THAT WHICH WAS WRITTEN.
12956  056676  005737  060370          TST     @#GFLAG1
```

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12957  056702  001004                BNE     G2
12958  056704  005137  060370        COM     @#GFLAG1
12959  056710  000261                SEC
12960  056712  000401                BR      G3
12961  056714  000241        G2:     CLC
12962  056716  006160  000006  G3:   ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
12963  056722  006160  000004        ROL     4(R0)
12964  056726  006160  000002        ROL     2(R0)
12965  056732  006110                ROL     (R0)
12966  056734  004737  060324        JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
12967                                                                 ;BUFFER.
12968  056740  077330                SOB     R3,G1
12969
12970                        ;TEST ACCUMULATOR 0 WITH FLOATING ZERO
12971  056742  012700  060404        MOV     #GPAT10,R0
12972  056746  012701  060434        MOV     #GDAT00,R1
12973  056752  004737  060246        JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
12974  056756  012703  000102        MOV     #102,R3
12975  056762                G4:
12976  056762  172410                LDD     (R0),AC0
12977  056764  174000                STD     AC0,AC0
12978  056766  172400                LDD     AC0,AC0         ;STORE THE TEST PATTERN.
12979  056770  174011                STD     AC0,(R1)
12980  056772  004737  060344        JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
12981                                                                 ;THAT WHICH WAS WRITTEN.
12982  056776  005737  060370        TST     @#GFLAG1
12983  057002  001004                BNE     G5
12984  057004  005137  060370        COM     @#GFLAG1
12985  057010  000241                CLC
12986  057012  000401                BR      G6
12987  057014  000261        G5:     SEC
12988  057016  006160  000006  G6:   ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
12989  057022  006160  000004        ROL     4(R0)
12990  057026  006160  000002        ROL     2(R0)
12991  057032  006110                ROL     (R0)
12992  057034  004737  060324        JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
12993                                                                 ;BUFFER.
12994  057040  077330                SOB     R3,G4
12995
12996                        ;TEST ACCUMULATOR 1 WITH FLOATING ONE
12997  057042  012700  060374        MOV     #GPAT00,R0
12998  057046  012701  060434        MOV     #GDAT00,R1
12999  057052  004737  060246        JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
13000  057056  012703  000102        MOV     #102,R3
13001  057062                G7:
13002  057062  172410                LDD     (R0),AC0
13003  057064  174001                STD     AC0,AC1
13004  057066  172401                LDD     AC1,AC0         ;STORE THE TEST PATTERN.
13005  057070  174011                STD     AC0,(R1)
13006  057072  004737  060344        JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
13007                                                                 ;THAT WHICH WAS WRITTEN.
13008  057076  005737  060370        TST     @#GFLAG1
13009  057102  001004                BNE     G10
13010  057104  005137  060370        COM     @#GFLAG1
13011  057110  000261                SEC
13012  057112  000401                BR      G11
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13013  057114  000241
13014  057116  006160  000006
13015  057122  006160  000004
13016  057126  006160  000002
13017  057132  006110
13018  057134  004737  060324
13019
13020  057140  077330
13021
13022
13023  057142  012700  060404
13024  057146  012701  060434
13025  057152  004737  060246
13026  057156  012703  000102
13027  057162
13028  057162  172410
13029  057164  174001
13030  057166  172401
13031  057170  174011
13032  057172  004737  060344
13033
13034  057176  005737  060370
13035  057202  001004
13036  057204  005137  060370
13037  057210  000241
13038  057212  000401
13039  057214  000261
13040  057216  006160  000006
13041  057222  006160  000004
13042  057226  006160  000002
13043  057232  006110
13044  057234  004737  060324
13045
13046  057240  077330
13047
13048
13049  057242  012700  060374
13050  057246  012701  060434
13051  057252  004737  060246
13052  057256  012703  000102
13053  057262
13054  057262  172410
13055  057264  174002
13056  057266  172402
13057  057270  174011
13058  057272  004737  060344
13059
13060  057276  005737  060370
13061  057302  001004
13062  057304  005137  060370
13063  057310  000261
13064  057312  000401
13065  057314  000241
13066  057316  006160  000006
13067  057322  006160  000004
13068  057326  006160  000002

G10:    CLC
G11:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
        ROL     4(R0)
        ROL     2(R0)
        ROL     (R0)
        JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
                                        ;BUFFER.
        SOB     R3,G7

;TEST ACCUMULATOR 1 WITH FLOATING ZERO
        MOV     #GPAT10,R0
        MOV     #GDAT00,R1
        JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
        MOV     #102,R3
G12:
        LDD     (R0),AC0
        STD     AC0,AC1
        LDD     AC1,AC0         ;STORE THE TEST PATTERN.
        STD     AC0,(R1)
        JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
                                        ;THAT WHICH WAS WRITTEN.
        TST     @#GFLAG1
        BNE     G13
        COM     @#GFLAG1
        CLC
        BR      G14
G13:    SEC
G14:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
        ROL     4(R0)
        ROL     2(R0)
        ROL     (R0)
        JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
                                        ;BUFFER.
        SOB     R3,G12

;TEST ACCUMULATOR 2 WITH FLOATING ONE
        MOV     #GPAT00,R0
        MOV     #GDAT00,R1
        JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
        MOV     #102,R3
G15:
        LDD     (R0),AC0
        STD     AC0,AC2
        LDD     AC2,AC0         ;STORE THE TEST PATTERN.
        STD     AC0,(R1)
        JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
                                        ;THAT WHICH WAS WRITTEN.
        TST     @#GFLAG1
        BNE     G16
        COM     @#GFLAG1
        SEC
        BR      G17
G16:    CLC
G17:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
        ROL     4(R0)
        ROL     2(R0)
```

```
13069  057332  006110                  ROL     (R0)
13070  057334  004737  060324          JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
13071                                                                   ;BUFFER.
13072  057340  077330                  SOB     R3,G15
13073
13074                                  ;TEST ACCUMULATOR 2 WITH FLOATING ZERO
13075  057342  012700  060404          MOV     #GPAT10,R0
13076  057346  012701  060434          MOV     #GDAT00,R1
13077  057352  004737  060246          JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
13078  057356  012703  000102          MOV     #102,R3
13079  057362                          G20:
13080  057362  172410                  LDD     (R0),AC0
13081  057364  174002                  STD     AC0,AC2
13082  057366  172402                  LDD     AC2,AC0         ;STORE THE TEST PATTERN.
13083  057370  174011                  STD     AC0,(R1)
13084  057372  004737  060344          JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
13085                                                                   ;THAT WHICH WAS WRITTEN.
13086  057376  005737  060370          TST     @#GFLAG1
13087  057402  001004                  BNE     G21
13088  057404  005137  060370          COM     @#GFLAG1
13089  057410  000241                  CLC
13090  057412  000401                  BR      G22
13091  057414  000261                  G21:    SEC
13092  057416  006160  000006          G22:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
13093  057422  006160  000004                  ROL     4(R0)
13094  057426  006160  000002                  ROL     2(R0)
13095  057432  006110                  ROL     (R0)
13096  057434  004737  060324          JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
13097                                                                   ;BUFFER.
13098  057440  077330                  SOB     R3,G20
13099
13100                                  ;TEST ACCUMULATOR 3 WITH FLOATING ONE
13101  057442  012700  060374          MOV     #GPAT00,R0
13102  057446  012701  060434          MOV     #GDAT00,R1
13103  057452  004737  060246          JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
13104  057456  012703  000102          MOV     #102,R3
13105  057462                          G23:
13106  057462  172410                  LDD     (R0),AC0
13107  057464  174003                  STD     AC0,AC3
13108  057466  172403                  LDD     AC3,AC0         ;STORE THE TEST PATTERN.
13109  057470  174011                  STD     AC0,(R1)
13110  057472  004737  060344          JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
13111                                                                   ;THAT WHICH WAS WRITTEN.
13112  057476  005737  060370          TST     @#GFLAG1
13113  057502  001004                  BNE     G24
13114  057504  005137  060370          COM     @#GFLAG1
13115  057510  000261                  SEC
13116  057512  000401                  BR      G25
13117  057514  000241                  G24:    CLC
13118  057516  006160  000006          G25:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
13119  057522  006160  000004                  ROL     4(R0)
13120  057526  006160  000002                  ROL     2(R0)
13121  057532  006110                  ROL     (R0)
13122  057534  004737  060324          JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
13123                                                                   ;BUFFER.
13124  057540  077330                  SOB     R3,G23
```

```
13125
13126
13127  057542  012700  060404          ;TEST ACCUMULATOR 3 WITH FLOATING ZERO
13128  057546  012701  060434                  MOV     #GPAT10,R0
13129  057552  004737  060246                  MOV     #GDAT00,R1
13130  057556  012703  000102                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
13131  057562                                  MOV     #102,R3
13132  057562  172410          G26:
13133  057564  174003                  LDD     (R0),AC0
13134  057566  172403                  STD     AC0,AC3
13135  057570  174011                  LDD     AC3,AC0         ;STORE THE TEST PATTERN.
13136  057572  004737  060344          STD     AC0,(R1)
13137                                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
13138  057576  005737  060370                                          ;THAT WHICH WAS WRITTEN.
13139  057602  001004                  TST     @#GFLAG1
13140  057604  005137  060370          BNE     G27
13141  057610  000241                  COM     @#GFLAG1
13142  057612  000401                  CLC
13143  057614  000261                  BR      G30
13144  057616  006160  000006  G27:    SEC
13145  057622  006160  000004  G30:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
13146  057626  006160  000002          ROL     4(R0)
13147  057632  006110                  ROL     2(R0)
13148  057634  004737  060324          ROL     (R0)
13149                                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
13150  057640  077330                                                  ;BUFFER.
13151                                  SOB     R3,G26
13152
13153  057642  012700  060374  ;TEST ACCUMULATOR 4 WITH FLOATING ONE
13154  057646  012701  060434          MOV     #GPAT00,R0
13155  057652  004737  060246          MOV     #GDAT00,R1
13156  057656  012703  000102          JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
13157  057662                          MOV     #102,R3
13158  057662  172410          G31:
13159  057664  174004                  LDD     (R0),AC0
13160  057666  172404                  STD     AC0,AC4
13161  057670  174011                  LDD     AC4,AC0         ;STORE THE TEST PATTERN.
13162  057672  004737  060344          STD     AC0,(R1)
13163                                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
13164  057676  005737  060370                                          ;THAT WHICH WAS WRITTEN.
13165  057702  001004                  TST     @#GFLAG1
13166  057704  005137  060370          BNE     G32
13167  057710  000261                  COM     @#GFLAG1
13168  057712  000401                  SEC
13169  057714  000241                  BR      G33
13170  057716  006160  000006  G32:    CLC
13171  057722  006160  000004  G33:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
13172  057726  006160  000002          ROL     4(R0)
13173  057732  006110                  ROL     2(R0)
13174  057734  004737  060324          ROL     (R0)
13175                                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
13176  057740  077330                                                  ;BUFFER.
13177                                  SOB     R3,G31
13178
13179  057742  012700  060404  ;TEST ACCUMULATOR 4 WITH FLOATING ZERO
13180  057746  012701  060434          MOV     #GPAT10,R0
                                        MOV     #GDAT00,R1
```

```
13181  057752  004737  060246          JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
13182  057756  012703  000102          MOV     #102,R3
13183  057762                  G34:
13184  057762  172410                  LDD     (R0),AC0
13185  057764  174004                  STD     AC0,AC4
13186  057766  172404                  LDD     AC4,AC0         ;STORE THE TEST PATTERN.
13187  057770  174011                  STD     AC0,(R1)
13188  057772  004737  060344          JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
13189                                                                  ;THAT WHICH WAS WRITTEN.
13190  057776  005737  060370          TST     @#GFLAG1
13191  060002  001004                  BNE     G35
13192  060004  005137  060370          COM     @#GFLAG1
13193  060010  000241                  CLC
13194  060012  000401                  BR      G36
13195  060014  000261          G35:    SEC
13196  060016  006160  000006  G36:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
13197  060022  006160  000004          ROL     4(R0)
13198  060026  006160  000002          ROL     2(R0)
13199  060032  006110                  ROL     (R0)
13200  060034  004737  060324          JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
13201                                                                  ;BUFFER.
13202  060040  077330                  SOB     R3,G34
13203
13204                          ;TEST ACCUMULATOR 5 WITH FLOATING ONE
13205  060042  012700  060374          MOV     #GPAT00,R0
13206  060046  012701  060434          MOV     #GDAT00,R1
13207  060052  004737  060246          JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
13208  060056  012703  000102          MOV     #102,R3
13209  060062                  G37:
13210  060062  172410                  LDD     (R0),AC0
13211  060064  174005                  STD     AC0,AC5
13212  060066  172405                  LDD     AC5,AC0         ;STORE THE TEST PATTERN.
13213  060070  174011                  STD     AC0,(R1)
13214  060072  004737  060344          JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
13215                                                                  ;THAT WHICH WAS WRITTEN.
13216  060076  005737  060370          TST     @#GFLAG1
13217  060102  001004                  BNE     G40
13218  060104  005137  060370          COM     @#GFLAG1
13219  060110  000261                  SEC
13220  060112  000401                  BR      G41
13221  060114  000241          G40:    CLC
13222  060116  006160  000006  G41:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
13223  060122  006160  000004          ROL     4(R0)
13224  060126  006160  000002          ROL     2(R0)
13225  060132  006110                  ROL     (R0)
13226  060134  004737  060324          JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
13227                                                                  ;BUFFER.
13228  060140  077330                  SOB     R3,G37
13229
13230                          ;TEST ACCUMULATOR 5 WITH FLOATING ?ERO
13231  060142  012700  060404          MOV     #GPAT10,R0
13232  060146  012701  060434          MOV     #GDAT00,R1
13233  060152  004737  060246          JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
13234  060156  012703  000102          MOV     #102,R3
13235  060162                  G42:
13236  060162  172410                  LDD     (R0),AC0
```

```
13237  060164  174005                  STD     AC0,AC5
13238  060166  172405                  LDD     AC5,AC0         ;STORE THE TEST PATTERN.
13239  060170  174011                  STD     AC0,(R1)
13240  060172  004737  060344          JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
13241                                                                   ;THAT WHICH WAS WRITTEN.
13242  060176  005737  060370          TST     @#GFLAG1
13243  060202  001004                  BNE     G43
13244  060204  005137  060370          COM     @#GFLAG1
13245  060210  000241                  CLC
13246  060212  000401                  BR      G44
13247  060214  000261          G43:    SEC
13248  060216  006160  000006  G44:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
13249  060222  006160  000004          ROL     4(R0)
13250  060226  006160  000002          ROL     2(R0)
13251  060232  006110                  ROL     (R0)
13252  060234  004737  060324          JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
13253                                                                   ;BUFFER.
13254  060240  077330                  SOB     R3,G42
13255
13256
13257  060242  000137  060444          JMP     @#GDONE
13258
13259                          ;USE THIS ROUTINE TO INITIALIZE ALL THE DATA BUFFERS.
13260  060246  012705  060370  GSETUP: MOV     #GFLAG1,R5
13261  060252  012704  000026          MOV     #26,R4
13262  060256  005025          1$:     CLR     (R5)+
13263  060260  077402                  SOB     R4,1$
13264
13265  060262  012705  060404          MOV     #GPAT10,R5
13266  060266  012704  000010          MOV     #10,R4
13267  060272  005125          2$:     COM     (R5)+
13268  060274  077402                  SOB     R4,2$
13269
13270  060276  020067  000072  GS1:    CMP     R0,GPAT00
13271  060302  001401                  BEQ     3$
13272  060304  000207                  RTS     PC
13273
13274  060306  012705  060434  3$:     MOV     #GDAT00,R5
13275  060312  012704  000004          MOV     #4,R4
13276  060316  005125          4$:     COM     (R5)+
13277  060320  077402                  SOB     R4,4$
13278  060322  000207                  RTS     PC
13279
13280  060324  012705  060434  GRESET: MOV     #GDAT00,R5
13281  060330  012704  000004          MOV     #4,R4
13282  060334  005025          1$:     CLR     (R5)+
13283  060336  077402                  SOB     R4,1$
13284  060340  000137  060276          JMP     @#GS1
13285
13286                          ;SEE IF THE DATA WRITTEN MATCHES THE DATA READ.
13287  060344  012705  060434  GCMP:   MOV     #GDAT00,R5
13288  060350  012704  000004          MOV     #4,R4
13289  060354  010002                  MOV     R0,R2
13290  060356  022225          1$:     CMP     (R2)+,(R5)+
13291  060360  001401                  BEQ     2$
13292  060362  104000                  EMT                     ;
```

```
13293  060364  077404                  2$:     SOB     R4,1$
13294  060366  000207                          RTS     PC
13295
13296
13297
13298
13299  060370  000000                  GFLAG1: 0
13300  060372  000000                  GFLAG2: 0
13301
13302  060374  000000                  GPAT00: 0
13303  060376  000000                  GPAT01: 0
13304  060400  000000                  GPAT02: 0
13305  060402  000000                  GPAT03: 0
13306
13307  060404  177777                  GPAT10: -1
13308  060406  177777                  GPAT11: -1
13309  060410  177777                  GPAT12: -1
13310  060412  177777                  GPAT13: -1
13311
13312  060414  177777                  GAND0:  -1
13313  060416  177777                  GAND1:  -1
13314  060420  177777                  GAND2:  -1
13315  060422  177777                  GAND3:  -1
13316
13317  060424  000000                  GOR0:   0
13318  060426  000000                  GOR1:   0
13319  060430  000000                  GOR2:   0
13320  060432  000000                  GOR3:   0
13321
13322  060434  000000                  GDAT00: 0
13323  060436  000000                  GDAT01: 0
13324  060440  000000                  GDAT02: 0
13325  060442  000000                  GDAT03: 0
13326
13327
13328  060444                          GDONE:
13329  060444  004767  044122                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
13330                                                                  ;SEE IF THE USER HAS EXPRESSED
13331                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
13332                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
13333                                                                  ;THE USER TYPED CONTROL G?).
13334
13335
13336                                  ;*****************************************************************************
13337                                  ;TEST 443       FPP ACCUMULATORS DUAL ADDRESS TEST
13338                                  ;*****************************************************************************
13339  060450                          TS443:
13340  060450  005037  061140          H1:     CLR     @#HFLAG
13341  060454  012700  061142                  MOV     #HA1W,R0                ;INITIALIZE THE LOAD BUFFER DATA.
13342  060460  012701  061262                  MOV     #HDAT1,R1
13343  060464  012703  000024                  MOV     #24,R3
13344  060470  012120                  H2:     MOV     (R1)+,(R0)+
13345  060472  077302                          SOB     R3,H2
13346
13347  060474  004767  000420                  JSR     PC,HCLR         ;CLEAR THE OUTPUT DATA BUFFER.
13348
```

```
13349  060500  170011                  H3:     SETD
13350                                  ;LOAD ACCUMULATOR 1
13351  060502  012700  061142                  MOV     #HA1W,R0
13352  060506  172410                          LDD     (R0),AC0
13353  060510  174001                          STD     AC0,AC1
13354                                  ;LOAD ACCUMULATOR 2
13355  060512  012700  061152                  MOV     #HA2W,R0
13356  060516  172410                          LDD     (R0),AC0
13357  060520  174002                          STD     AC0,AC2
13358                                  ;LOAD ACCUMULATOR 3
13359  060522  012700  061162                  MOV     #HA3W,R0
13360  060526  172410                          LDD     (R0),AC0
13361  060530  174003                          STD     AC0,AC3
13362                                  ;LOAD ACCUMULATOR 4
13363  060532  012700  061172                  MOV     #HA4W,R0
13364  060536  172410                          LDD     (R0),AC0
13365  060540  174004                          STD     AC0,AC4
13366                                  ;LOAD ACCUMULATOR 5
13367  060542  012700  061202                  MOV     #HA5W,R0
13368  060546  172410                          LDD     (R0),AC0
13369  060550  174005                          STD     AC0,AC5
13370
13371  060552  004737  061006          H4:     JSR     PC,@#HSTD               ;GO READ ALL ACCUMULATORS BACK.
13372
13373  060556  004737  061064                  JSR     PC,@#HCMP               ;SEE IF DATA IS CORRECT.
13374
13375                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 1,
13376                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
13377                                  ;THE DATA.
13378  060562  012700  061142                  MOV     #HA1W,R0
13379  060566  012702  000004                  MOV     #4,R2
13380  060572  010001                          MOV     R0,R1
13381  060574  005121                  H5:     COM     (R1)+
13382  060576  172410                          LDD     (R0),AC0
13383  060600  174001                          STD     AC0,AC1
13384  060602  004737  061006                  JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
13385  060606  004737  061064                  JSR     PC,@#HCMP               ;CHECK THE DATA.
13386  060612  077210                          SOB     R2,H5
13387
13388                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 2,
13389                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
13390                                  ;THE DATA.
13391  060614  012700  061152                  MOV     #HA2W,R0
13392  060620  012702  000004                  MOV     #4,R2
13393  060624  010001                          MOV     R0,R1
13394  060626  005121                  H6·     COM     (R1)+
13395  060630  172410                          LDD     (R0),AC0
13396  060632  174002                          STD     AC0,AC2
13397  060634  004737  061006                  JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
13398  060640  004737  061064                  JSR     PC,@#HCMP               ;CHECK THE DATA.
13399  060644  077210                          SOB     R2,H6
13400
13401                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 3,
13402                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
13403                                  ;THE DATA.
13404  060646  012700  061162                  MOV     #HA3W,R0
```

```
13405  060652  012702  000004          MOV     #4,R2
13406  060656  010001                  MOV     R0,R1
13407  060660  005121          H7:     COM     (R1)+
13408  060662  172410                  LDD     (R0),AC0
13409  060664  174003                  STD     AC0,AC3
13410  060666  004737  061006          JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
13411  060672  004737  061064          JSR     PC,@#HCMP               ;CHECK THE DATA.
13412  060676  077210                  SOB     R2,H7
13413
13414                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 4,
13415                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
13416                                  ;THE DATA.
13417  060700  012700  061172          MOV     #HA4W,R0
13418  060704  012702  000004          MOV     #4,R2
13419  060710  010001                  MOV     R0,R1
13420  060712  005121          H10:    COM     (R1)+
13421  060714  172410                  LDD     (R0),AC0
13422  060716  174004                  STD     AC0,AC4
13423  060720  004737  061006          JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
13424  060724  004737  061064          JSR     PC,@#HCMP               ;CHECK THE DATA.
13425  060730  077210                  SOB     R2,H10
13426
13427                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 5,
13428                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
13429                                  ;THE DATA.
13430  060732  012700  061202          MOV     #HA5W,R0
13431  060736  012702  000004          MOV     #4,R2
13432  060742  010001                  MOV     R0,R1
13433  060744  005121          H11:    COM     (R1)+
13434  060746  172410                  LDD     (R0),AC0
13435  060750  174005                  STD     AC0,AC5
13436  060752  004737  061006          JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
13437  060756  004737  061064          JSR     PC,@#HCMP               ;CHECK THE DATA.
13438  060762  077210                  SOB     R2,H11
13439
13440
13441  060764  005737  061140          TST     @#HFLAG
13442  060770  001402                  BEQ     H12
13443  060772  000137  061332          JMP     @#HDONE
13444
13445  060776  005137  061140  H12:    COM     @#HFLAG
13446  061002  000137  060500          JMP     @#H3
13447
13448                                  ;STORE ALL ACCUMULATORS IN THE OUTPUT BUFFERS.
13449  061006  004737  061120  HSTD:   JSR     PC,@#HCLR               ;CLEAR ALL OUTPUT BUFFERS.
13450                                  ;STORE ACCUMULATOR 1
13451  061012  012704  061212          MOV     #HA1R,R4
13452  061016  172401                  LDD     AC1,AC0
13453  061020  174014                  STD     AC0,(R4)
13454                                  ;STORE ACCUMULATOR 2
13455  061022  012704  061222          MOV     #HA2R,R4
13456  061026  172402                  LDD     AC2,AC0
13457  061030  174014                  STD     AC0,(R4)
13458                                  ;STORE ACCUMULATOR 3
13459  061032  012704  061232          MOV     #HA3R,R4
13460  061036  172403                  LDD     AC3,AC0
```

```
13461  061040  174014                    STD     AC0,(R4)
13462                                ;STORE ACCUMULATOR 4
13463  061042  012704  061242            MOV     #HA4R,R4
13464  061046  172404                    LDD     AC4,AC0
13465  061050  174014                    STD     AC0,(R4)
13466                                ;STORE ACCUMULATOR 5
13467  061052  012704  061252            MOV     #HA5R,R4
13468  061056  172405                    LDD     AC5,AC0
13469  061060  174014                    STD     AC0,(R4)
13470  061062  000207                    RTS     PC
13471
13472                                ;COMPARE DATA LOADED WITH DATA READ.
13473  061064  012637  061136    HCMP:   MOV     (SP)+,@#HADR        ;SAVE RETURN ADDRESS.
13474  061070  012703  061142            MOV     #HA1W,R3
13475  061074  012704  061212            MOV     #HA1R,R4
13476  061100  012705  000024            MOV     #24,R5
13477  061104  022324             HCMP1: CMP     (R3)+,(R4)+
13478  061106  001401                    BEQ     HCMP2
13479  061110  104000                    EMT                 ;
13480  061112  077504             HCMP2: SOB     R5,HCMP1
13481  061114  000177  000016            JMP     @HADR
13482
13483                                ;CLEAR THE DATA OUTPUT BUFFER.
13484  061120  012704  061212    HCLR:   MOV     #HA1R,R4
13485  061124  012705  000024            MOV     #24,R5
13486  061130  005024             HCLR1: CLR     (R4)+
13487  061132  077502                    SOB     R5,HCLR1
13488  061134  000207                    RTS     PC
13489
13490  061136  000000             HADR:  0
13491  061140  000000             HFLAG: 0
13492
13493  061142  000000  000000  000000  HA1W:   .WORD   0,0,0,0
13494  061150  000000
13495  061152  000000  000000  000000  HA2W:   .WORD   0,0,0,0
13496  061160  000000
13497  061162  000000  000000  000000  HA3W:   .WORD   0,0,0,0
13498  061170  000000
13499  061172  000000  000000  000000  HA4W:   .WORD   0,0,0,0
13500  061200  000000
13501  061202  000000  000000  000000  HA5W:   .WORD   0,0,0,0
13502  061210  000000
13503
13504  061212  000000  000000  000000  HA1R:   .WORD   0,0,0,0
13505  061220  000000
13506  061222  000000  000000  000000  HA2R:   .WORD   0,0,0,0
13507  061230  000000
13508  061232  000000  000000  000000  HA3R:   .WORD   0,0,0,0
13509  061240  000000
13510  061242  000000  000000  000000  HA4R:   .WORD   0,0,0,0
13511  061250  000000
13512  061252  000000  000000  000000  HA5R:   .WORD   0,0,0,0
13513  061260  000000
13514
13515  061262  073567  073567  073567  HDAT1:  .WORD   73567,73567,73567,73567
13516  061270  073567
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13517  061272  063146  063146  063146  HDAT2:  .WORD   63146,63146,63146,63146
13518  061300  063146
13519  061302  010421  010421  010421  HDAT3:  .WORD   10421,10421,10421,10421
13520  061310  010421
13521  061312  031463  031463  031463  HDAT4:  .WORD   31463,31463,31463,31463
13522  061320  031463
13523  061322  042104  042104  042104  HDAT5:  .WORD   42104,42104,42104,42104
13524  061330  042104
13525
13526  061332                          HDONE:
13527  061332  004767  043234                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
13528                                                                  ;SEE IF THE USER HAS EXPRESSED
13529                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
13530                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
13531                                                                  ;THE USER TYPED CONTROL G?).
13532
13533
13534                                  ;*************************************************************************************
13535                                  ;TEST 444       FSRC MODE 0 WITH ILLEGAL ACCUMULATOR TEST
13536                                  ;*************************************************************************************
13537  061336                          TS444:
13538  061336  170011                          SETD                    ;SET FD
13539  061340  012700  061620                  MOV     #SPAT10,R0      ;LOAD AC0
13540  061344  172410                          LDD     (R0),AC0
13541
13542  061346  012737  061524  000244          MOV     #SERR0,@#FPVECT ;USE OF THE NON-EXISTENT AC-
13543                                                                  ;CUMULATOR SHOULD RESULT IN
13544                                                                  ;A TRAP TO 244.
13545  061354  012700  000001                  MOV     #1,R0           ;A FAILURE IN THE FSRC FLOWS
13546                                                                  ;WILL RESULT IN AN ODD ADDRESS
13547  061360  012737  061432  000004          MOV     #SERR1,@#ERRVECT ;TRAP TO 4.
13548  061366  005003                          CLR     R3
13549
13550  061370  172407                  SX2:    LDD     AC7,AC0
13551  061372  170000                  SX3:    CFCC
13552  061374  005203                          INC     R3
13553  061376  005203                  SX4:    INC     R3
13554
13555  061400  012701  061630                  MOV     #SDAT00,R1      ;NO TRAP OCCURRED!!
13556  061404  174011                          STD     AC0,(R1)        ;SEE IF AC0 WAS MODIFIED.
13557
13558  061406  012701  061630                  MOV     #SDAT00,R1
13559  061412  012702  061620                  MOV     #SPAT10,R2
13560  061416  012703  000004                  MOV     #4,R3
13561  061422  022122                  SX5:    CMP     (R1)+,(R2)+
13562  061424  001401                          BEQ     SX6
13563  061426  104000                          EMT                     ;
13564  061430  077304                  SX6:    SOB     R3,SX5
13565  061432                          SERR1:
13566  061432  104000                          EMT                     ;
13567
13568                                  ;NOW TEST AC6.
13569  061434  170011                  SX7:    SETD
13570  061436  012700  061620                  MOV     #SPAT10,R0      ;LOAD AC0
13571  061442  172410                          LDD     (R0),AC0
13572  061444  012737  061574  000244          MOV     #SERR4,@#FPVECT
```

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13573  061452  012700  000001            MOV     #1,R0
13574  061456  005003                    CLR     R3
13575
13576  061460  172406            SX8:    LDD     AC6,AC0
13577  061462  170000            SX9:    CFCC
13578  061464  005203                    INC     R3
13579  061466  005203            SX10:   INC     R3
13580
13581  061470  012701  061630            MOV     #SDAT00,R1
13582  061474  174011                    STD     AC0,(R1)                ;NO TRAP! GET AC0.
13583
13584  061476  012701  061630            MOV     #SDAT00,R1              ;WAS AC0 MODIFIED.
13585  061502  012702  061620            MOV     #SPAT10,R2
13586  061506  012703  000004            MOV     #4,R3
13587  061512  022122            SX11:   CMP     (R1)+,(R2)+
13588  061514  001401                    BEQ     SX12
13589  061516  104000                    EMT                             ;
13590  061520  077304            SX12:   SOB     R3,SX11
13591  061522  104000                    EMT                             ;
13592
13593                             ;TRAPPED TO 244.
13594  061524  021627  061372    SERR0:  CMP     (SP),#SX3               ;PC OF TRAP CORRECT?
13595  061530  001401                    BEQ     1$
13596  061532  104000                    EMT                             ;
13597  061534  012737  061434  061614  1$:     MOV     #SX7,@#SADR
13598  061542  022626            SERR10: CMP     (SP)+,(SP)+
13599  061544  005004                    CLR     R4
13600  061546  170204                    STFPS   R4                      ;IS FPS CORRECT?
13601  061550  022704  100200            CMP     #100200,R4
13602  061554  001326                    BNE     SERR1
13603
13604  061556  005004                    CLR     R4
13605  061560  170304                    STST    R4                      ;IS FEC CORRECT?
13606  061562  022704  000002            CMP     #2,R4
13607  061566  001321                    BNE     SERR1
13608  061570  000177  000020            JMP     @SADR
13609
13610  061574  021627  061462    SERR4:  CMP     (SP),#SX9
13611  061600  001401                    BEQ     1$
13612  061602  104000                    EMT                             ;
13613  061604  012737  061640  061614  1$:     MOV     #SDONE,@#SADR
13614  061612  000753                    BR      SERR10
13615
13616  061614  000000            SADR:   0
13617  061616  177777                    -1
13618  061620  010421            SPAT10: 10421
13619  061622  021042            SPAT11: 21042
13620  061624  031463            SPAT12: 31463
13621  061626  042104            SPAT13: 42104
13622
13623  061630  000000            SDAT00: 0
13624  061632  000000            SDAT01: 0
13625  061634  000000            SDAT02: 0
13626  061636  000000            SDAT03: 0
13627
13628  061640                    SDONE:
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13629  061640  004767  042726                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
13630                                                                 ;SEE IF THE USER HAS EXPRESSED
13631                                                                 ;THE DESIRE TO CHANGE THE SOFTWARE
13632                                                                 ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
13633                                                                 ;THE USER TYPED CONTROL G?).
13634
13635                                        ;*******************************************************************************
13636                                        ;TEST 445       FSRC MODE 2 TEST
13637                                        ;*******************************************************************************
13638  061644                                TS445:
13639  061644                                J1:
13640  061644  170011                               SETD                    ;SET DOUBLE MODE
13641
13642  061646  012700  061774                       MOV     #JDAT0,R0
13643  061652  172410                               LDD     (R0),AC0        ;LOAD AC0=ALL 1
13644
13645  061654  012700  061754                       MOV     #JDATI0,R0
13646  061660  005003                               CLR     R3
13647
13648  061662  172420                J2:     LDD     (R0)+,AC0       ;TEST INSTRUCTION
13649  061664  005203                J3:     INC     R3
13650  061666  005203                J4:     INC     R3
13651
13652  061670  012701  061764                       MOV     #JDAT00,R1
13653  061674  174011                               STD     AC0,(R1)        ;PICK UP RESULTS
13654
13655  061676  020027  061744                       CMP     R0,#JBUF0       ;WAS AN AUTO
13656  061702  001001                               BNE     1$
13657  061704  104000                               EMT                     ;
13658  061706  012702  061754        1$:     MOV     #JDATI0,R2      ;IS DATA CORRECT?
13659  061712  012703  061764                       MOV     #JDAT00,R3
13660  061716  012704  000004                       MOV     #4,R4
13661  061722  022223                J5:     CMP     (R2)+,(R3)+
13662  061724  001401                               BEQ     J6
13663  061726  104000                               EMT                     ;
13664  061730  077404                J6:     SOB     R4,J5
13665
13666  061732  022700  061764                       CMP     #JDATI0+10,R0   ;WAS R0 INCREM.
13667  061736  001401                               BEQ     J7
13668  061740  104000                               EMT                     ;
13669  061742  000420                J7:     BR      JDONE
13670
13671  061744  010421                JBUF0:  .WORD   010421
13672  061746  021042                JBUF1:          021042
13673  061750  042104                JBUF2:          042104
13674  061752  031463                JBUF3:          031463
13675
13676  061754  052525                JDATI0:         052525
13677  061756  114631                JDATI1:         114631
13678  061760  063146                JDATI2:         063146
13679  061762  073567                JDATI3:         073567
13680
13681  061764  000000                JDAT00:         0
13682  061766  000000                JDAT01:         0
13683  061770  000000                JDAT02:         0
13684  061772  000000                JDAT03:         0
```

```
13685
13686  061774  177777                  JDAT0:          -1
13687  061776  177777                  JDAT1:          -1
13688  062000  177777                  JDAT2:          -1
13689  062002  177777                  JDAT3:          -1
13690
13691
13692  062004                          JDONE:
13693  062004  004767  042562                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
13694                                                                  ;SEE IF THE USER HAS EXPRESSED
13695                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
13696                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
13697                                                                  ;THE USER TYPED CONTROL G?).
13698
13699
13700                                  ;*****************************************************************************************
13701                                  ;TEST 446       FSRC MODE 4 TEST
13702                                  ;*****************************************************************************************
13703  062010                          TS446:
13704  062010  170011                          SETD                    ;SET DOUBLE MODE
13705
13706  062012  012700  062140                  MOV     #KPAT0,R0
13707  062016  172410                          LDD     (R0),AC0        ;LOAD A DEFAULT
13708                                                                  ;PATTERN INTO AC0
13709  062020  012700  062120                  MOV     #KBUF0,R0
13710  062024  005003                          CLR     R3
13711  062026  172440                  KX2:    LDD     -(R0),AC0       ;TEST INSTRUCTION
13712  062030  005203                  KX3:    INC     R3
13713  062032  005203                  KX4:    INC     R3
13714
13715  062034  012701  062130                  MOV     #KDAT00,R1
13716  062040  174011                          STD     AC0,(R1)        ;PICK UP THE RESULT
13717
13718  062042  020027  062130                  CMP     R0,#KBUF0+10    ;WAS AN AUTO
13719  062046  001001                          BNE     1$
13720  062050  104000                          EMT                     ;
13721  062052  012702  062110          1$:     MOV     #KDATI0,R2      ;IS DATA CORRECT?
13722  062056  012703  062130                  MOV     #KDAT00,R3
13723  062062  012704  000004                  MOV     #4,R4
13724  062066  022223                  KX5:    CMP     (R2)+,(R3)+
13725  062070  001401                          BEQ     KX6
13726  062072  104000                          EMT                     ;
13727  062074  077404                  KX6:    SOB     R4,KX5
13728
13729  062076  022700  062110                  CMP     #KBUF0-10,R0    ;WAS R0 DECREMENTED
13730  062102  001401                          BEQ     KX7
13731  062104  104000                          EMT                     ;
13732  062106  000420                  KX7:    BR      KDONE
13733
13734  062110  052525                  KDATI0: .WORD   052525
13735  062112  114631                  KDATI1:         114631
13736  062114  063140                  KDATI2:         063140
13737  062116  073567                  KDATI3:         073567
13738
13739  062120  010421                  KBUF0:          010421
13740  062122  031463                  KBUF1:          031463
```

```
13741  062124  042104                  KBUF2:          042104
13742  062126  021042                  KBUF3:          021042
13743
13744  062130  000000                  KDAT00:         0
13745  062132  000000                  KDAT01:         0
13746  062134  000000                  KDAT02:         0
13747  062136  000000                  KDAT03:         0
13748
13749  062140  177777                  KPAT0:          -1
13750  062142  177777                  KPAT1:          -1
13751  062144  177777                  KPAT2:          -1
13752  062146  177777                  DPAT3:          -1
13753
13754  062150                          KDONE:
13755  062150  004767  042416                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
13756                                                                  ;SEE IF THE USER HAS EXPRESSED
13757                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
13758                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
13759                                                                  ;THE USER TYPED CONTROL G?).
13760
13761
13762                                  ;*******************************************************************************
13763                                  ;TEST 447       FSRC MODE 2, WITH FD=0, TEST
13764                                  ;*******************************************************************************
13765  062154                          TS447:
13766  062154                          L1:
13767  062154  170011                          SETD                    ;SET DOUBLE MODE
13768
13769  062156  012700  062302                  MOV     #LPAT10,R0
13770  062162  172410                          LDD     (R0),AC0        ;LOAD AC0
13771
13772  062164  012700  062324                  MOV     #LDAT10,R0      ;SET UP THE INPUT
13773  062170  012701  062312                  MOV     #LPAT20,R1      ;DATA
13774  062174  012702  000004                  MOV     #4,R2
13775
13776  062200  012120                  1$:     MOV     (R1)+,(R0)+
13777  062202  077202                          SOB     R2,1$
13778
13779  062204  012700  062324                  MOV     #LDAT10,R0
13780  062210  005003                          CLR     R3
13781  062212  170001                          SETF                    ;CLEAR FD.
13782
13783  062214  172420                  L2:     LDF     (R0)+,AC0
13784  062216  005203                  L3:     INC     R3
13785
13786  062220                          L4:
13787  062220  170011                          SETD                    ;SET FD
13788
13789  062222  012701  062336                  MOV     #LDAT00,R1
13790  062226  174011                          STD     AC0,(R1)        ;PICK UP RESULTS
13791
13792  062230  020027  062330                  CMP     R0,#LDAT12      ;WAS R0 INCREMENTED
13793  062234  001401                          BEQ     1$
13794  062236  104000                          EMT                     ;
13795  062240  012737  177777  062330  1$:     MOV     #-1,@#LDAT12
13796  062246  012737  177777  062332          MOV     #-1,@#LDAT13
```

```
13797  062254  012702  062324          MOV     #LDATI0,R2      ;IS DATA CORRECT
13798  062260  012703  062336          MOV     #LDAT00,R3
13799  062264  012704  000004          MOV     #4,R4
13800
13801  062270  022223          L5:     CMP     (R2)+,(R3)+
13802  062272  001401                  BEQ     L6
13803  062274  104000                  EMT                     ;
13804  062276  077404          L6:     SOB     R4,L5
13805  062300  000422                  BR      LDONE
13806
13807  062302  177777          LPAT10: .WORD   -1
13808  062304  177777          LPAT11:         -1
13809  062306  177777          LPAT12:         -1
13810  062310  177777          LPAT13:         -1
13811
13812  062312  052525          LPAT20:         052525
13813  062314  114631          LPAT21:         114631
13814  062316  063142          LPAT22:         063142
13815  062320  073567          LPAT23:         073567
13816  062322  000001                  .WORD   000001
13817  062324  000000          LDATI0:         0
13818  062326  000000          LDATI1:         0
13819  062330  000000          LDATI2:         0
13820  062332  000000          LDATI3:         0
13821  062334  000001                  .WORD   00001
13822  062336  000000          LDAT00:         0
13823  062340  000000          LDAT01:         0
13824  062342  000000          LDAT02:         0
13825  062344  000000          LDAT03:         0
13826
13827  062346                  LDONE:
13828  062346  004767  042220          JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
13829                                                          ;SEE IF THE USER HAS EXPRESSED
13830                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
13831                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
13832                                                          ;THE USER TYPED CONTROL G?).
13833
13834
13835                          ;*****************************************************************************
13836                          ;TEST 450       FSRC MODE 2 WITH GR7, IMMEDIATE MODE, TEST
13837                          ;*****************************************************************************
13838  062352                  TS450:
13839
13840  062352                  M1:
13841  062352  170011                  SETD
13842
13843  062354  012700  062454          MOV     #MPAT10,R0
13844  062360  172410                  LDD     (R0),AC0        ;LOAD BACKROUND
13845                                                          ;PATTERN INTO AC0.
13846  062362  005004                  CLR     R4
13847  062364  012737  062412  000004  MOV     #MERR3,@#ERRVECT
13848
13849  062372  172427  000000  M15:    LDD     #0,AC0          ;TEST INSTRUCTION
13850          062374                  .=.-2           ;EFFECTIVELY: 05204 IS PUT IN THE FIRST
13851  062374  005204                  .WORD   5204    ;16 BIT WORD, OR THE "EXP-FRACTION" WORD.
13852  062376  005204          M2:     INC     R4              ;NOTE THAT
```

```
13853  062400  005204                  M3:     INC     R4              ;005204=INC R4
13854  062402  005204                  M4:     INC     R4
13855  062404  020427  000003                  CMP     R4,#3           ;SEE IF THE PC
13856  062410  001401                          BEQ     M8
13857  062412                          MERR3:
13858  062412  104000                          EMT                     ;
13859  062414  012700  062474          M8:     MOV     #MDAT00,R0
13860  062420  174010                          STD     AC0,(R0)        ;GET THE DATA
13861
13862  062422  012700  062474                  MOV     #MDAT00,R0
13863  062426  022720  005204                  CMP     #5204,(R0)+     ;IS THE DATA CORRECT?
13864  062432  001401                          BEQ     M5
13865  062434  104000                          EMT                     ;
13866  062436  012701  000003          M5:     MOV     #3,R1
13867  062442  005720                  M6:     TST     (R0)+
13868  062444  001401                          BEQ     M7
13869  062446  104000                          EMT                     ;
13870  062450  077104                  M7:     SOB     R1,M6
13871  062452  000414                          BR      MDONE
13872
13873  062454  177777                  MPAT10: -1
13874  062456  177777                  MPAT11: -1
13875  062460  177777                  MPAT12: -1
13876  062462  177777                  MPAT13: -1
13877
13878  062464  005204                  MPAT20: 5204
13879  062466  005204                  MPAT21: 5204
13880  062470  005204                  MPAT22: 5204
13881  062472  005204                  MPAT23: 5204
13882
13883  062474  000000                  MDAT00: 0
13884  062476  000000                  MDAT01: 0
13885  062500  000000                  MDAT02: 0
13886  062502  000000                  MDAT03: 0
13887
13888  062504                          MDONE:
13889  062504  004767  042062                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
13890                                                                  ;SEE IF THE USER HAS EXPRESSED
13891                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
13892                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
13893                                                                  ;THE USER TYPED CONTROL G?).
13894
13895
13896                                  ;*****************************************************************************
13897                                  ;TEST 451       FSRC MODE 3 TEST
13898                                  ;*****************************************************************************
13899  062510                          TS451:
13900
13901  062510                          N1:
13902  062510  170011                          SETD                    ;SET FD MODE
13903
13904  062512  012700  062640                  MOV     #NPAT10,R0
13905  062516  172410                          LDD     (R0),AC0        ;LOAD AC0 WITH A DEFAULT
13906                                                                  ;PATTERN
13907  062520  012700  062626                  MOV     #NPAT20,R0
13908  062524  005003                          CLR     R3
```

```
13909  062526  012737  062600  000004          MOV     #NERR0,@#ERRVECT        ;IF A FAILURE OCCURS
13910                                                                           ;IN THE FSRC FLOWS AN
13911                                                                           ;ODD TRAP TO 4 COULD OCCUR
13912  062534  172430                  N2:     LDD     @(R0)+,AC0              ;TEST INSTRUCTION.
13913  062536  005203                  N3:     INC     R3
13914  062540  005203                  N4:     INC     R3
13915
13916  062542  012701  062606                  MOV     #NDAT00,R1
13917  062546  174011                          STD     AC0,(R1)                ;GET THE DATA
13918
13919  062550  020027  062630                  CMP     R0,#NPAT20+2            ;WAS R0 INCREMENTED
13920  062554  001401                          BEQ     N12
13921  062556  104000                          EMT                             ;
13922  062560  012702  062606          N12:    MOV     #NDAT00,R2              ;DATA CORRECT
13923  062564  012703  062650                  MOV     #NDATI0,R3
13924  062570  012704  000004                  MOV     #4,R4
13925  062574  022223                  N13:    CMP     (R2)+,(R3)+
13926  062576  001401                          BEQ     N14
13927  062600                          NERR0:
13928  062600  104000                          EMT                             ;
13929  062602  077404                  N14:    SOB     R4,N13
13930  062604  000425                          BR      NDONE
13931
13932  062606  000000                  NDAT00: .WORD   0
13933  062610  000000                  NDAT01:         0
13934  062612  000000                  NDAT02:         0
13935  062614  000000                  NDAT03:         0
13936
13937  062616  052525  052525  052525          .WORD   52525,52525,52525,52525
13938  062624  052525
13939  062626  062650                  NPAT20: .WORD   NDATI0
13940  062630  070707                  NPAT21:         070707
13941  062632  070707                  NPAT22:         070707
13942  062634  070707                  NPAT23:         070707
13943  062636  000001                          .WORD   1
13944  062640  177777                  NPAT10: .WORD   -1
13945  062642  177777                  NPAT11:         -1
13946  062644  177777                  NPAT12:         -1
13947  062646  177777                  NPAT13:         -1
13948
13949  062650  010421                  NDATI0: .WORD   010421
13950  062652  021042                  NDATI1:         021042
13951  062654  031463                  NDATI2:         031463
13952  062656  042104                  NDATI3:         042104
13953
13954  062660                          NDONE:
13955  062660  004767  041706                  JSR     PC,.RSET                ;GO INITIALIZE THE FPS AND STACK; AND
13956                                                                          ;SEE IF THE USER HAS EXPRESSED
13957                                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
13958                                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
13959                                                                          ;THE USER TYPED CONTROL G?).
13960
13961
13962                          ;*******************************************************************************
13963                          ;TEST 452       FSRC MODE 5 TEST
13964                          ;*******************************************************************************
```

```
13965  062664                                  TS452:
13966
13967  062664                                  01:
13968  062664  170011                                  SETD                    ;SET FD MODE
13969
13970  062666  012700  063014                          MOV     #OPAT10,R0
13971  062672  172410                          LDD     (R0),AC0        ;LOAD AC0 WITH A
13972                                                                   ;DEFAULT PATTERN.
13973  062674  012700  063002                          MOV     #OPAT21,R0
13974  062700  005003                          CLR     R3
13975  062702  012737  062732  000004          MOV     #OERR0,@#ERRVEC ;IF A FAILURE
13976                                                                   ;OCCURS IN THE FSRC
13977                                                                   ;FLOWS AN ODD ADDR.
13978                                                                   ;TRAP TO 4 MAY OCCUR.
13979  062710  172450                  02:     LDD     @-(R0),AC0      ;TEST INSTRUCTION
13980  062712  005203                  03:     INC     R3
13981  062714  005203                  04:     INC     R3
13982
13983  062716  012701  062762                  MOV     #ODAT00,R1
13984  062722  174011                          STD     AC0,(R1)        ;GET THE DATA
13985
13986  062724  020027  063000                  CMP     R0,#OPAT20      ;WAS R0 DECREMENTED
13987  062730  001401                          BEQ     012
13988  062732                          OERR0:
13989  062732  104000                          EMT                     ;
13990  062734  012702  062762          012:    MOV     #ODAT00,R2      ;DATA CORRECT?
13991  062740  012703  063024                  MOV     #ODATI0,R3
13992  062744  012704  000004                  MOV     #4,R4
13993  062750  022223                  013:    CMP     (R2)+,(R3)+
13994  062752  001401                          BEQ     014
13995  062754  104000                          EMT                     ;
13996  062756  077404                  014:    SOB     R4,013
13997  062760  000425                          BR      ODONE
13998
13999  062762  000000                  ODAT00: .WORD   0
14000  062764  000000                  ODAT01:         0
14001  062766  000000                  ODAT02:         0
14002  062770  000000                  ODAT03:         0
14003
14004  062772  052525  052525  052525          .WORD   52525,52525,52525
14005  063000  063024                  OPAT20: .WORD   ODATI0
14006  063002  070707                  OPAT21: 070707
14007  063004  070707                  OPAT22: 070707
14008  063006  070707                  OPAT23: 070707
14009  063010  070707                  OPAT24: 070707
14010  063012  000001                          .WORD   1
14011  063014  177777                  OPAT10: .WORD   -1
14012  063016  177777                  OPAT11:         -1
14013  063020  177777                  OPAT12:         -1
14014  063022  177777                  OPAT13:         -1
14015
14016  063024  073567                  ODATI0: .WORD   73567
14017  063026  004210                  ODATI1:         004210
14018  063030  114631                  ODATI2:         114631
14019  063032  125252                  ODATI3:         125252
14020
```

```
14021  063034
14022  063034  004767  041532          ODONE:  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
14023                                                                   ;SEE IF THE USER HAS EXPRESSED
14024                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
14025                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
14026                                                                   ;THE USER TYPED CONTROL G?).
14027
14028
14029                                  ;*****************************************************************************
14030                                  ;TEST 453       FSRC MODE 6 TEST
14031                                  ;*****************************************************************************
14032  063040                          TS453:
14033
14034  063040                          P1:
14035  063040  170011                         SETD                    ;SET FD MODE
14036
14037  063042  012700  063126                 MOV     #PPAT10,R0
14038  063046  172410                 LDD     (R0),AC0        ;LOAD A DEFAULT PATTERN
14039                                                          ;INTO AC0
14040  063050  012700  062675                 MOV     #PDAT10-241,R0  ;COULD OCCUR.
14041
14042  063054  172460  000241         P2:     LDD     241(R0),AC0
14043          063056                  P3=P2+2
14044
14045  063060  012701  063146         P4:     MOV     #PDAT00,R1
14046  063064  174011                 STD     AC0,(R1)        ;GET THE DATA
14047  063066  012703  000004                 MOV     #4,R3
14048  063072  012702  063136                 MOV     #PDAT10,R2
14049  063076  012701  063146                 MOV     #PDAT00,R1
14050  063102  022221                 P5:     CMP     (R2)+,(R1)+     ;CHECK THE DATA
14051  063104  001401                 BEQ     2$
14052  063106  104000                 EMT                     ;
14053  063110  077304                 2$:     SOB     R3,P5
14054  063112  022700  062675                 CMP     #PDAT10-241,R0  ;R0 CORRECT?
14055  063116  001401                 BEQ     1$
14056  063120  104000                 EMT                     ;
14057  063122  000137  063156         1$:     JMP     @#PDONE
14058  063126  177777                 PPAT10: .WORD   -1
14059  063130  177777                 PPAT11:         -1
14060  063132  177777                 PPAT12:         -1
14061  063134  177777                 PPAT13:         -1
14062
14063  063136  010421                 PDAT10: .WORD   010421
14064  063140  031463                 PDAT11:         031463
14065  063142  052525                 PDAT12:         052525
14066  063144  073567                 PDAT13:         073567
14067
14068  063146  000000                 PDAT00: .WORD   0
14069  063150  000000                 PDAT01:         0
14070  063152  000000                 PDAT02:         0
14071  063154  000000                 PDAT03:         0
14072
14073  063156                          PDONE:
14074  063156  004767  041410                 JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
14075                                                                  ;SEE IF THE USER HAS EXPRESSED
14076                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
```

```
14077                                           ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
14078                                           ;THE USER TYPED CONTROL G?).
14079
14080
14081                           ;*****************************************************************************
14082                           ;TEST 454       FSRC MODE 7 TEST
14083                           ;*****************************************************************************
14084  063162                   TS454:
14085
14086  063162                   Q1:
14087  063162  170011                  SETD
14088
14089  063164  012700  063250          MOV     #QPAT10,R0
14090  063170  172410                  LDD     (R0),AC0        ;LOAD A DEFAULT
14091                                                          ;PATTERN INTO AC0
14092  063172  012700  063017          MOV     #QPAT20-241,R0
14093
14094  063176  172470  000241  Q2:     LDD     @241(R0),AC0
14095          063200          Q3=Q2+2
14096
14097  063202  012701  063270  Q4:     MOV     #QDAT00,R1
14098  063206  174011                  STD     AC0,(R1)        ;GET THE DATA
14099
14100  063210  012703  000004          MOV     #4,R3
14101  063214  012704  063270          MOV     #QDAT00,R4
14102  063220  012705  063300          MOV     #QDAT10,R5
14103  063224  022425          Q5:     CMP     (R4)+,(R5)+     ;CHECK THE DATA
14104  063226  001401                  BEQ     2$
14105  063230  104000                  EMT                     ;
14106  063232  077304          2$:     SOB     R3,Q5
14107
14108  063234  022700  063017          CMP     #QPAT20-241,R0  ;CHECK R0.
14109  063240  001401                  BEQ     1$
14110  063242  104000                  EMT                     ;
14111  063244  000137  063310  1$:     JMP     @#QDONE
14112
14113  063250  177777          QPAT10: .WORD   -1
14114  063252  177777          QPAT11:         -1
14115  063254  177777          QPAT12:         -1
14116  063256  177777          QPAT13:         -1
14117
14118  063260  063300          QPAT20: .WORD   QDAT10
14119  063262  052525          QPAT21:         52525
14120  063264  052525          QPAT22:         52525
14121  063266  052525          QPAT23:         52525
14122
14123  063270  000000          QDAT00: .WORD   0
14124  063272  000000          QDAT01:         0
14125  063274  000000          QDAT02:         0
14126  063276  000000          QDAT03:         0
14127
14128  063300  073567          QDAT10: .WORD   073567
14129  063302  052525          QDAT11: .WORD   052525
14130  063304  031463          QDAT12: .WORD   031463
14131  063306  010421          QDAT13: .WORD   010421
14132
```

```
14133  063310
14134  063310  004767  041256                QDONE:
                                                    JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
                                                                            ;SEE IF THE USER HAS EXPRESSED
                                                                            ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                            ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                            ;THE USER TYPED CONTROL G?).
                                                    ;*******************************************************************************
                                                    ;TEST 455       (BUT EZBT Y8),(BUT ENBT) AND (BUT FIUV) TEST
                                                    ;*******************************************************************************
14143  063314                                       TS455:
14144  063314  005037  064066                            CLR     @#UFLAG
14145  063320  012700  064016                            MOV     #UPAT00,R0      ;SET UP AC#0 DATA.
14146  063324  012701  000004                            MOV     #4,R1
14147  063330  012720  177777                U0:         MOV     #-1,(R0)+
14148  063334  077103                                    SOB     R1,U0
14149
14150  063336  012737  000033  064070                    MOV     #033,@#UTMP1
14151  063344  012737  000023  064072                    MOV     #023,@#UTMP2
14152  063352  012737  063436  000244          U1:       MOV     #UERR0,@#FPVECT ;IN CASE (BUT FIUV FAILS)
14153  063360  012700  000200                            MOV     #200,R0
14154  063364  170100                                    LDFPS   R0
14155  063366  012700  064016                            MOV     #UPAT00,R0      ;LOAD AC0
14156  063372  172410                                    LDD     (R0),AC0
14157  063374  013737  064070  064074                    MOV     @#UTMP1,@#UROM1
14158  063402  012737  000001  064076                    MOV     #001,@#UROM2
14159  063410  012737  000254  064100                    MOV     #254,@#UROM3
14160
14161  063416  012700  064026                            MOV     #UPAT10,R0      ;LOAD 0 INTO AC0
14162  063422  172410                          U2:       LDD     (R0),AC0
14163  063424  012704  000204                            MOV     #204,R4         ;SEE IF FPS IS CORRECT
14164  063430  170205                                    STFPS   R5
14165
14166  063432  020405                                    CMP     R4,R5
14167  063434  001401                                    BEQ     U3
14168  063436                                  UERR0:
14169  063436  104000                                    EMT                     ;
14170  063440  012700  000200                U3:         MOV     #200,R0
14171  063444  170100                                    LDFPS   R0
14172
14173  063446  012700  064016                            MOV     #UPAT00,R0      ;LOAD AC0
14174  063452  172410                                    LDD     (R0),AC0
14175  063454  013737  064072  064074                    MOV     @#UTMP2,@#UROM1
14176  063462  012737  000003  064076                    MOV     #003,@#UROM2
14177  063470  012737  000054  064100                    MOV     #054,@#UROM3
14178
14179  063476  012700  064036                            MOV     #UPAT20,R0      ;LOAD A POSITIVE NUMBER
14180                                                                          ;INTO AC0
14181  063502  172410                          U4:       LDD     (R0),AC0
14182  063504  012704  000200                            MOV     #200,R4         ;FPS CORRECT?
14183  063510  170205                                    STFPS   R5
14184
14185  063512  020405                                    CMP     R4,R5
14186  063514  001401                                    BEQ     U5
14187  063516  104000                                    EMT                     ;
14188  063520  012700  000200                U5:         MOV     #200,R0
```

```
14189  063524  170100                          LDFPS   R0
14190  063526  012700  064016                  MOV     #UPAT00,R0      ;LOAD AC0
14191  063532  172410                          LDD     (R0),AC0
14192  063534  013737  064072  064074          MOV     @#UTMP2,@#UROM1
14193  063542  012737  000403  064076          MOV     #403,@#UROM2
14194  063550  012737  000056  064100          MOV     #056,@#UROM3
14195  063556  012700  064046                  MOV     #UPAT30,R0      ;LOAD A NEGATIUE
14196                                                                  ;NUMBER INTO AL0
14197  063562  172410                  U6:     LDD     (R0),AC0
14198  063564  012704  000210                  MOV     #210,R4         ;FPS CORRECT
14199  063570  170205                          STFPS   R5
14200  063572  020405                          CMP     R4,R5
14201  063574  001401                          BEQ     U7
14202  063576  104000                          EMT                     ;
14203  063600  012700  000200          U7:     MOV     #200,R0
14204  063604  170100                          LDFPS   R0
14205  063606  012700  064016                  MOV     #UPAT00,R0      ;LOAD AC0
14206  063612  172410                          LDD     (R0),AC0
14207  063614  013737  064070  064074          MOV     @#UTMP1,@#UROM1
14208  063622  012737  000401  064076          MOV     #401,@#UROM2
14209  063630  012737  000256  064100          MOV     #256,@#UROM3
14210  063636  012700  064056                  MOV     #UPAT40,R0      ;LOAD -0 INTO AC0
14211  063642  172410                  U10:    LDD     (R0),AC0
14212  063644  000240                  U11:    NOP                     ;TRAP FROM HERE IF
14213  063646  012704  000214                  MOV     #214,R4         ;SEE IF FPS IS CORRECT.
14214  063652  170205                          STFPS   R5
14215  063654  020405                          CMP     R4,R5
14216  063656  001401                          BEQ     U12
14217  063660  104000                          EMT                     ;
14218  063662  005737  064066          U12:    TST     @#UFLAG ;SEE IF ALL THE PATTERNS
14219  063666  001021                          BNE     U14             ;HAVE BEEN TEST WITH
14220                                                                  ;BOTH AC NOT EQUAL TO 0 AND AC=0
14221  063670  012700  064016                  MOV     #UPAT00,R0      ;IF NOT GO BACK AND
14222  063674  012701  000004                  MOV     #4,R1           ;CHECK THEM WITH AC=0
14223  063700  005020                  U13:    CLR     (R0)+
14224  063702  077102                          SOB     R1,U13
14225  063704  012737  177777  064066          MOV     #-1,@#UFLAG
14226  063712  012737  000233  064070          MOV     #233,@#UTMP1
14227  063720  012737  000223  064072          MOV     #223,@#UTMP2
14228  063726  000137  063352                  JMP     @#U1
14229                          ;NOW SEE IF A TRAP CAN BE FORCED BY SETTING FIUV AND LOADING -0
14230  063732  012737  063770  000244  U14:    MOV     #UERR3,@#FPVECT
14231  063740  012700  004200                  MOV     #4200,R0        ;SET FD AND FIUV
14232  063744  170100                          LDFPS   R0
14233  063746  012700  064016                  MOV     #UPAT00,R0      ;SET UP AC0
14234  063752  172410                          LDD     (R0),AC0
14235  063754  012700  064056                  MOV     #UPAT40,R0      ;LOAD -0
14236  063760  172410                  U15:    LDD     (R0),AC0        ;SHOULD TRAP TO 244
14237  063762  170000                  U16:    CFCC
14238  063764  000240                          NOP
14239  063766  104000                          EMT                     ;
14240
14241                          ;INTERRUPT HERE WHEN FIUV SET AND ATTEMPTED TO LOAD-0
14242  063770  021627  063762  UERR3:  CMP     (SP),#U16
14243  063774  001401                          BEQ     1$
14244  063776  104000                          EMT                     ;
```

```
14245  064000  022626          1$:     CMP     (SP)+,(SP)+
14246  064002  005000                  CLR     R0
14247  064004  170300                  STST    R0              ;GET FEC.
14248  064006  022700  000014        CMP     #14,R0          ;CORRECT
14249  064012  001433                  BEQ     UDONE
14250  064014  104000                  EMT                     ;
14251  064016  000000          UPAT00: .WORD   0
14252  064020  000000          UPAT01:         0
14253  064022  000000          UPAT02:         0
14254  064024  000000          UPAT03:         0
14255
14256  064026  000000          UPAT10: .WORD   0               ;0
14257  064030  000000          UPAT11:         0
14258  064032  000000          UPAT12:         0
14259  064034  000000          UPAT13:         0
14260
14261  064036  010421          UPAT20: .WORD   010421          ;POS NUM
14262  064040  114631          UPAT21:         114631
14263  064042  125252          UPAT22:         125252
14264  064044  177777          UPAT23:         177777
14265
14266  064046  114631          UPAT30:         114631          ;NEG NUM
14267  064050  135673          UPAT31:         135673
14268  064052  146314          UPAT32:         146314
14269  064054  167356          UPAT33:         167356
14270
14271  064056  100000          UPAT40:         100000          ;NEG ZERO
14272  064060  000000          UPAT41:         0
14273  064062  000000          UPAT42:         0
14274  064064  000000          UPAT43:         0
14275
14276  064066  000000          UFLAG:  .WORD   0
14277  064070  000000          UTMP1:          0
14278  064072  000000          UTMP2:          0
14279  064074  000000          UROM1:          0
14280  064076  000000          UROM2:          0
14281  064100  000000          UROM3:          0
14282  064102                  UDONE:
14283
14284
14285                           ;*****************************************************************************************
14286                           ;TEST 456       ADDF,ADDD,SUBF AND SUBD WITH FSRC=AC=0 TEST
14287                           ;*****************************************************************************************
14288  064102                  TS456:
14289  064102  012700  000200          MOV     #200,R0
14290  064106  170100                  LDFPS   R0              ;SET DOUBLE MODE
14291  064110  012700  064432          MOV     #WPAT00,R0      ;LOAD AC0=:
14292  064114  172410                  LDD     (R0),AC0
14293  064116  012700  064432          MOV     #WPAT00,R0
14294  064122  172010          W2:     ADDD    (R0),AC0        ;TEST INSTRUCTION. ADD ITSELF
14295  064124  170205                  STFPS   R5              ;GET FPS
```

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14296  064126  170011                  SETD                    ;SET DOUBLE MODE
14297  064130  012700  064432          MOV     #WPAT00,R0
14298  064134  174010                  STD     AC0,(R0)        ;GET THE RESULT
14299  064136  012701  064432          MOV     #WPAT00,R1
14300  064142  012702  000004          MOV     #4,R2
14301  064146  022021          W3:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT
14302  064150  001401                  BEQ     W4
14303  064152  104000                  EMT                     ;
14304  064154  077204          W4:     SOB     R2,W3
14305  064156  022705  000204          CMP     #204,R5         ;IS FPS CORRECT
14306  064162  001401                  BEQ     W5
14307  064164  104000                  EMT                     ;
14308  064166  012700  000200  W5:     MOV     #200,R0
14309  064172  170100                  LDFPS   R0              ;SET DOUBLE MODE
14310  064174  012700  064432          MOV     #WPAT00,R0      ;LOAD AC0=0
14311  064200  172410                  LDD     (R0),AC0
14312  064202  005000                  CLR     R0
14313  064204  170100                  LDFPS   R0              ;GO TO FLOATING MODE
14314  064206  012700  064432          MOV     #WPAT00,R0
14315  064212  172010          W6:     ADDF    (R0),AC0        ;TEST INSTRUCTION
14316  064214  170205                  STFPS   R5              ;GET FPS
14317  064216  170011                  SETD                    ;RESET TO DOUBLE MODE
14318  064220  012700  064432          MOV     #WPAT00,R0
14319  064224  174010                  STD     AC0,(R0)        ;GET THE RESULT
14320  064226  012701  064432          MOV     #WPAT00,R1
14321  064232  012702  000004          MOV     #4,R2
14322  064236  022021          W7:     CMP     (R0)+,(R1)+     ;WAS THE RESULT
14323  064240  001401                  BEQ     W10
14324  064242  104000                  EMT                     ;
14325  064244  077204          W10:    SOB     R2,W7
14326  064246  022705  000004          CMP     #4,R5           ;WAS FPS CORRECT
14327  064252  001401                  BEQ     W11
14328  064254  104000                  EMT                     ;
14329  064256  012700  000200  W11:    MOV     #200,R0
14330  064262  170100                  LDFPS   R0              ;SET DOUBLE MODE
14331  064264  012700  064432          MOV     #WPAT00,R0      ;LOAD AC0=0
14332  064270  172410                  LDD     (R0),AC0
14333  064272  012700  064432          MOV     #WPAT00,R0
14334  064276  173010          W12:    SUBD    (R0),AC0        ;TEST INSTRUCTION
14335  064300  170205                  STFPS   R5              ;GET FPS
14336  064302  170011                  SETD                    ;SET DOUBLE MODE
14337  064304  012700  064432          MOV     #WPAT00,R0
14338  064310  174010                  STD     AC0,(R0)        ;GET THE RESULT
14339  064312  012701  064432          MOV     #WPAT00,R1
14340  064316  012702  000004          MOV     #4,R2
14341  064322  022021          W13:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
14342  064324  001401                  BEQ     W14
14343  064326  104000                  EMT                     ;
14344  064330  077204          W14:    SOB     R2,W13
14345  064332  022705  000204          CMP     #204,R5         ;IS FPS CORRECT?
14346  064336  001401                  BEQ     W15
14347  064340  104000                  EMT                     ;
14348  064342  012700  000200  W15:    MOV     #200,R0
14349  064346  170100                  LDFPS   R0              ;SET DOUBLE MODE
14350  064350  012700  064432          MOV     #WPAT00,R0      ;LOAD AC0=0
14351  064354  172410                  LDD     (R0),AC0
```

```
14352  064356  005000                  CLR     R0
14353  064360  170100                  LDFPS   R0              ;ENTER FLOATING MODE.
14354  064362  012700  064432          MOV     #WPAT00,R0
14355  064366  173010          W16:    SUBF    (R0),AC0        ;TEST INSTRUCTION.
14356  064370  170205                  STFPS   R5              ;GET FPS
14357  064372  170011                  SETD                    ;RESET TO DOUBLE MODE
14358  064374  012700  064432          MOV     #WPAT00,R0      ;GET THE RESULT.
14359  064400  174010                  STD     AC0,(R0)
14360  064402  012701  064432          MOV     #WPAT00,R1
14361  064406  012702  000004          MOV     #4,R2
14362  064412  022021          W17:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
14363  064414  001401                  BEQ     W20
14364  064416  104000                  EMT                     ;
14365  064420  077204          W20:    SOB     R2,W17
14366  064422  022705  000004          CMP     #4,R5           ;IS FPS CORRECT?
14367  064426  001411                  BEQ     WDONE
14368  064430  104000                  EMT                     ;
14369
14370  064432  000000          WPAT00: .WORD   0
14371  064434  000000          WPAT01:         0
14372  064436  000000          WPAT02:         0
14373  064440  000000          WPAT03:         0
14374
14375  064442  000000          WDAP00: .WORD   0
14376  064444  000000          WDAT01:         0
14377  064446  000000          WDAT02:         0
14378  064450  000000          WDAT03:         0
14379
14380  064452                  WDONE:
14381  064452  004767  040114          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
14382                                                          ;SEE IF THE USER HAS EXPRESSED
14383                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
14384                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
14385                                                          ;THE USER TYPED CONTROL G?).
14386
14387
14388                          ;*****************************************************************************
14389                          ;TEST 457       ADDD AND SUB WITH FSRC=0
14390                          ;*****************************************************************************
14391  064456                  TS457:
14392  064456  012700  000200          MOV     #200,R0
14393  064462  170100                  LDFPS   R0              ;SET DOUBLE MODE
14394  064464  012700  065016          MOV     #XPAT00,R0      ;SET AC0 TO POSITIVE
14395  064470  172410                  LDD     (R0),AC0
14396  064472  012700  065026          MOV     #XPAT10,R0      ;FSRC=0
14397  064476  172010          X2:     ADDD    (R0),AC0        ;TEST INSTRUCTION
14398  064500  170205                  STFPS   R5
14399  064502  170011                  SETD
14400  064504  012700  065006          MOV     #XDAT00,R0      ;GET RESULT.
14401  064510  174010                  STD     AC0,(R0)
14402  064512  012701  065016          MOV     #XPAT00,R1
14403  064516  012702  000004          MOV     #4,R2
14404  064522  022021          X3:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
14405  064524  001401                  BEQ     X4
14406  064526  104000                  EMT                     ;
14407  064530  077204          X4:     SOB     R2,X3
```

```
14408  064532  012704  000200          MOV     #200,R4
14409  064536  020405                  CMP     R4,R5           ;IS FPS CORRECT?
14410  064540  001401                  BEQ     X5
14411  064542  104000                  EMT                     ;
14412  064544  012700  000200  X5:     MOV     #200,R0
14413  064550  170100                  LDFPS   R0              ;SET DOUBLE MODE
14414  064552  012700  065036          MOV     #XPAT20,R0      ;SET AC0 TO
14415  064556  172410                  LDD     (R0),AC0
14416  064560  012700  065026          MOV     #XPAT10,R0      ;FSRC=0
14417  064564  172010          X6:     ADDD    (R0),AC0        ;TEST INSTRUCTION
14418  064566  170205                  STFPS   R5
14419  064570  170011                  SETD
14420  064572  012700  065006          MOV     #XDAT00,R0      ;GET RESULT
14421  064576  174010                  STD     AC0,(R0)
14422  064600  012701  065036          MOV     #XPAT20,R1
14423  064604  012702  000004          MOV     #4,R2
14424  064610  022021          X7:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
14425  064612  001401                  BEQ     X10
14426  064614  104000                  EMT                     ;
14427  064616  077204          X10:    SOB     R2,X7
14428  064620  012704  000210          MOV     #210,R4
14429  064624  020405                  CMP     R4,R5           ;IS FPS CORRECT?
14430  064626  001401                  BEQ     X11
14431  064630  104000                  EMT                     ;
14432  064632  012700  000200  X11:     MOV     #200,R0
14433  064636  170100                  LDFPS   R0              ;SET DOUBLE MODE
14434  064640  012700  065016          MOV     #XPAT00,R0      ;SET AC0 TO NON-ZERO
14435  064644  172410                  LDD     (R0),AC0
14436  064646  012700  065026          MOV     #XPAT10,R0      ;FSRC=0
14437  064652  173010          X12:    SUBD    (R0),AC0        ;TEST INSTRUCTION
14438  064654  170205                  STFPS   R5
14439  064656  170011                  SETD
14440  064660  012700  065006          MOV     #XDAT00,R0      ;GET RESULT
14441  064664  174010                  STD     AC0,(R0)
14442  064666  012701  065016          MOV     #XPAT00,R1
14443  064672  012702  000004          MOV     #4,R2
14444  064676  022021          X13:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
14445  064700  001401                  BEQ     X14
14446  064702  104000                  EMT                     ;
14447  064704  077204          X14:    SOB     R2,X13
14448  064706  012704  000200          MOV     #200,R4         ;IS FPS CORRECT?
14449  064712  020405                  CMP     R4,R5
14450  064714  001401                  BEQ     X15
14451  064716  104000                  EMT                     ;
14452  064720  012700  000200  X15:     MOV     #200,R0
14453  064724  170100                  LDFPS   R0              ;SET DOUBLE MODE
14454  064726  012700  065036          MOV     #XPAT20,R0      ;SET AC0=A NEGATIVE
14455  064732  172410                  LDD     (R0),AC0
14456  064734  012700  065026          MOV     #XPAT10,R0      ;FSRC=0
14457  064740  173010          X16:    SUBD    (R0),AC0        ;TEST INSTRUCTION.
14458  064742  170205                  STFPS   R5
14459  064744  170011                  SETD
14460  064746  012700  065006          MOV     #XDAT00,R0      ;GET RESULT
14461  064752  174010                  STD     AC0,(R0)
14462  064754  012701  065036          MOV     #XPAT20,R1
14463  064760  012702  000004          MOV     #4,R2
```

```
14464  064764  022021                  X17:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
14465  064766  001401                          BEQ     X20
14466  064770  104000                          EMT                     ;
14467  064772  077204                  X20:    SOB     R2,X17
14468  064774  012704  000210                  MOV     #210,R4         ;IS FPS CORRECT?
14469  065000  020405                          CMP     R4,R5
14470  065002  001421                          BEQ     XDONE
14471  065004  104000                          EMT                     ;
14472  065006  000000                  XDAT00: .WORD   0
14473  065010  000000                  XDAT01:         0
14474  065012  000000                  XDAT02:         0
14475  065014  000000                  XDAT03:         0
14476
14477  065016  010421                  XPAT00: .WORD   010421
14478  065020  021042                  XPAT01:         021042
14479  065022  031463                  XPAT02:         031463
14480  065024  042104                  XPAT03:         042104
14481
14482  065026  000000                  XPAT10: .WORD   0
14483  065030  000000                  XAPT11:         0
14484  065032  000000                  XPAT12:         0
14485  065034  000000                  XPAT13:         0
14486  065036  104210                  XPAT20: .WORD   104210
14487  065040  114631                  XPAT21:         114631
14488  065042  125252                  XPAT22:         125252
14489  065044  135673                  XPAT23:         135673
14490
14491  065046                          XDONE:
14492  065046  004767  037520                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
14493                                                                  ;SEE IF THE USER HAS EXPRESSED
14494                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
14495                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
14496                                                                  ;THE USER TYPED CONTROL G?).
14497
14498                          ;*****************************************************************************
14499                          ;TEST 460       SUBD WITH AC=0 TEST
14500                          ;*****************************************************************************
14501  065052                  TS460:
14502  065052  005037  065226                 CLR     @#YFLAG
14503  065056  012737  065246  065230         MOV     #YPAT00,@#YTMP1 ;P
14504  065064  012737  065256  065232         MOV     #YPAT10,@#YTMP2 ;N
14505  065072  012737  000210  065234         MOV     #210,@#YTMP3
14506  065100  012700  000200          Y1:    MOV     #200,R0
14507  065104  170100                         LDFPS   R0              ;SET DOUBLE MODE
14508  065106  012700  065266                 MOV     #YPAT20,R0      ;SET AC0=0
14509  065112  172410                         LDD     (R0),AC0
14510  065114  013700  065230                 MOV     @#YTMP1,R0
14511  065120  173010          Y2:    SUBD    (R0),AC0        ;TEST INSTRUCTION
14512  065122  170205                         STFPS   R5
14513  065124  170011                         SETD
14514  065126  012700  065236                 MOV     #YDAT00,R0      ;GET RESULT
14515  065132  174010                         STD     AC0,(R0)
14516  065134  012702  000004                 MOV     #4,R2
14517  065140  013701  065232                 MOV     @#YTMP2,R1      ;CHECK RESULT.
14518  065144  022021          Y3:    CMP     (R0)+,(R1)+
14519  065146  001401                         BEQ     1$
```

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14520  065150  104000                          EMT                             ;
14521  065152  077204                  1$:     SOB     R2,Y3
14522  065154  023705  065234                  CMP     @#YTMP3,R5              ;FPS CORRECT?
14523  065160  001401                          BEQ     Y4
14524  065162  104000                          EMT                             ;
14525  065164  005737  065226          Y4:     TST     @#YFLAG                 ;FINISHED TEST?
14526  065170  001015                          BNE     Y5
14527  065172  012737  177777  065226          MOV     #-1,@#YFLAG
14528  065200  012737  065256  065230          MOV     #YPAT10,@#YTMP1
14529  065206  012737  065246  065232          MOV     #YPAT00,@#YTMP2
14530  065214  012737  000200  065234          MOV     #200,@#YTMP3
14531  065222  000726                          BR      Y1
14532  065224  000424                  Y5:     BR      YDONE
14533
14534  065226  000000                  YFLAG:  .WORD   0
14535  065230  000000                  YTMP1:          0
14536  065232  000000                  YTMP2:          0
14537  065234  000000                  YTMP3:          0
14538
14539  065236  000000                  YDAT00: .WORD   0
14540  065240  000000                  YDAT01:         0
14541  065242  000000                  YDAT02:         0
14542  065244  000000                  YDAT03:         0
14543
14544  065246  063146                  YPAT00:         063146
14545  065250  052525                  YPAT01:         052525
14546  065252  042104                  YPAT02:         042104
14547  065254  167356                  YPAT03:         167356
14548
14549  065256  163146                  YPAT10:         163146
14550  065260  052525                  YPAT11:         052525
14551  065262  042104                  YPAT12:         042104
14552  065264  167356                  YPAT13:         167356
14553
14554  065266  000000                  YPAT20:         0
14555  065270  000000                  YPAT21:         0
14556  065272  000000                  YPAT22:         0
14557  065274  000000                  YPAT23:         0
14558
14559  065276                          YDONE:
14560  065276  004767  037270                  JSR     PC,.RSET                ;GO INITIALIZE THE FPS AND STACK; AND
14561                                                                          ;SEE IF THE USER HAS EXPRESSED
14562                                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
14563                                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
14564                                                                          ;THE USER TYPED CONTROL G?).
14565                                  ;*****************************************************************************
14566                                  ;TEST 461       ADDD WITH AC=0 TEST
14567                                  ;*****************************************************************************
14568  065302                          TS461:
14569  065302  005067  000134                  CLR     ZFLAG
14570  065306  012737  065460  065444          MOV     #ZPAT00,@#ZTMP1 ;P
14571  065314  012737  000200  065446          MOV     #200,@#ZTMP2
14572  065322  012700  000200          Z1:     MOV     #200,R0
14573  065326  170100                          LDFPS   R0                      ;SET DOUBLE MODE
14574  065330  012700  065500                  MOV     #ZPAT20,R0              ;SET AC0=0
14575  065334  172410                          LDD     (R0),AC0
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14576  065336  013700  065444              MOV     @#ZTMP1,R0
14577  065342  172010              Z2:     ADDD    (R0),AC0        ;TEST INSTRUCTION
14578  065344  170205                      STFPS   R5
14579  065346  170011                      SETD
14580  065350  012700  065450              MOV     #ZDAT00,R0      ;GET RESULT
14581  065354  174010                      STD     AC0,(R0)
14582  065356  012702  000004              MOV     #4,R2
14583  065362  013701  065444              MOV     @#ZTMP1,R1      ;RESULT CORRECT?
14584  065366  022021              Z3:     CMP     (R0)+,(R1)+
14585  065370  001401                      BEQ     Z4
14586  065372  104000                      EMT                     ;
14587  065374  077204              Z4:     SOB     R2,Z3
14588  065376  023705  065446              CMP     @#ZTMP2,R5      ;FPS CORRECT?
14589  065402  001401                      BEQ     Z5
14590  065404  104000                      EMT                     ;
14591  065406  005737  065442              TST     @#ZFLAG         ;FINISHED TEST?
14592  065412  001012                      BNE     Z6
14593  065414  012737  177777  065442      MOV     #-1,@#ZFLAG
14594  065422  012737  065470  065444      MOV     #ZPAT10,@#ZTMP1
14595  065430  012737  000210  065446      MOV     #210,@#ZTMP2
14596  065436  000731                      BR      Z1
14597  065440  000423              Z6:     BR      ZDONE
14598
14599  065442  000000              ZFLAG:  .WORD   0
14600  065444  000000              ZTMP1:          0
14601  065446  000000              ZTMP2:          0
14602
14603  065450  000000              ZDAT00: .WORD   0
14604  065452  000000              ZDAT01:         0
14605  065454  000000              ZDAT02:         0
14606  065456  000000              ZDAT03:         0
14607
14608  065460  031463              ZPAT00:         031463
14609  065462  010421              ZPAT01:         010421
14610  065464  146314              ZPAT02:         146314
14611  065466  156735              ZPAT03:         156735
14612
14613  065470  156735              ZPAT10:         156735
14614  065472  167356              ZPAT11:         167356
14615  065474  135673              ZPAT12:         135673
14616  065476  146314              ZPAT13:         146314
14617
14618  065500  000000              ZPAT20:         0
14619  065502  000000              ZPAT21:         0
14620  065504  000000              ZPAT22:         0
14621  065506  000000              ZPAT23:         0
14622
14623  065510                      ZDONE:
14624  065510  004767  037056              JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
14625                                                              ;SEE IF THE USER HAS EXPRESSED
14626                                                              ;THE DESIRE TO CHANGE THE SOFTWARE
14627                                                              ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
14628                                                              ;THE USER TYPED CONTROL G?).
14629
14630
14631                               ;*****************************************************************************************
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14632
14633
14634  065514
14635  065514  012700  003240          ;TEST 462       ADDF AND ADDD WITH E(AC)=E(FSRC) TEST AND (BUT FT) TEST
14636  065520  170100                  ;*****************************************************************************
14637  065522  012700  065724          TS462:
14638                                          MOV     #3240,R0
14639  065526  172410                          LDFPS   R0              ;SET FIU FIV FD AND FT
14640  065530  012700  065734                  MOV     #AAPAT0,R0      ;FLOWS IN TRAP WILL
14641  065534  172010                                                  ;OCCUR
14642                                          LDD     (R0),AC0        ;SET UP AC0
14643  065536  012700  065714                  MOV     #AAPAT1,R0
14644  065542  174010                  AA2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
14645  065544  012701  065744                                          ;SHOULD TRUNCATE
14646  065550  012702  000004          AA3:    MOV     #AADAT0,R0
14647  065554  022021                          STD     AC0,(R0)        ;GET THE RESULT
14648  065556  001401                          MOV     #AAPAT2,R1
14649  065560  104000                          MOV     #4,R2
14650  065562  077204                  AA4:    CMP     (R0)+,(R1)+     ;CORRECT?
14651                                          BEQ     AA7
14652                                          EMT                     ;
14653                                  AA7:    SOB     R2,AA4
14654
14655  065564  012700  003200          ;NOW TEST DOUBLE FLOATING ROUND MODE.
14656  065570  170100                  ;A 1 SHOULD BE ADDED TO THE LSB ON ROUNG MODE.
14657  065572  012700  065724
14658  065576  172410                          MOV     #3200,R0        ;SET FD FIV FIV. FT=0
14659  065600  012700  065734                  LDFPS   R0
14660  065604  172010                          MOV     #AAPAT0,R0
14661                                          LDD     (R0),AC0        ;SET UP AC0 OPERAND
14662  065606  012700  065714                  MOV     #AAPAT1,R0
14663  065612  174010                  AA11:   ADDD    (R0),AC0        ;TEST INSTRUCTION
14664  065614  012701  065754                                          ;SHOULD ROUND
14665  065620  012702  000004          AA12:   MOV     #AADAT0,R0
14666  065624  022021                          STD     AC0,(R0)        ;GET THE RESULT
14667  065626  001401                          MOV     #AAPAT3,R1
14668  065630  104000                          MOV     #4,R2
14669  065632  077204                  AA13:   CMP     (R0)+,(R1)+     ;CORRECT?
14670                                          BEQ     AA20
14671                                          EMT                     ;
14672                                  AA20:   SOB     R2,AA13
14673  065634  012700  003200          ;NOW TEST ADDF WITH FT=0, ROUND MODE
14674  065640  170100
14675  065642  012700  065724                  MOV     #3200,R0                ;FIV=1, FIV=1, FT=0
14676  065646  172410                          LDFPS   R0
14677  065650  170001                          MOV     #AAPAT0,R0      ;LOAD AC0 OPERAND
14678  065652  012700  065774                  LDD     (R0),AC0
14679  065656  172010                          SETF                    ;ENTER FLOATING MODE
14680                                          MOV     #AAPAT5,R0
14681  065660                          AA22:   ADDF    (R0),AC0        ;TEST INSTRUCTION
14682  065660  170011                                                  ;SHOULD ROUND
14683                                  AA23:
14684  065662  012700  065714                  SETD                    ;RESET TO DOUBLE
14685  065666  174010                                                  ;MODE
14686  065670  012701  066004                  MOV     #AADAT0,R0      ;GET THE RESULT
14687  065674  012702  000002                  STD     AC0,(R0)
                                                MOV     #AAPAT6,R1      ;CORRECT?
                                                MOV     #2,R2
```

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14688  065700  022021                  AA24:   CMP     (R0)+,(R1)+
14689  065702  001401                          BEQ     AA27
14690  065704  104000                          EMT                     ;
14691  065706  077204                  AA27:   SOB     R2,AA24
14692  065710  000137  066014                  JMP     @#AADONE
14693  065714  000000                  AADAT0:         0
14694  065716  000000                          0
14695  065720  000000                          0
14696  065722  000000                          0
14697  065724  000200                  AAPAT0:         200
14698  065726  000000                          0
14699  065730  000000                          0
14700  065732  000000                          0
14701  065734  000200                  AAPAT1:         200
14702  065736  000000                          0
14703  065740  000000                          0
14704  065742  000001                          1
14705  065744  000400                  AAPAT2:         400
14706  065746  000000                          0
14707  065750  000000                          0
14708  065752  000000                          0
14709  065754  000400                  AAPAT3:         400
14710  065756  000000                          0
14711  065760  000000                          0
14712  065762  000001                          1
14713  065764  000400                  AAPAT4:         400
14714  065766  000000                          0
14715  065770  100000                          100000
14716  065772  000000                          0
14717  065774  000200                  AAPAT5:         200
14718  065776  000001                          1
14719  066000  000000                          0
14720  066002  000000                          0
14721  066004  000400                  AAPAT6:         400
14722  066006  000001                          1
14723  066010  000000                          0
14724  066012  000000                          0
14725  066014                          AADONE:
14726  066014  004767  036552                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
14727                                                                  ;SEE IF THE USER HAS EXPRESSED
14728                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
14729                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
14730                                                                  ;THE USER TYPED CONTROL G?).
14731                                  ;*****************************************************************************
14732                                  ;TEST 463       ADDF AND ADDD WITH E(AC) LESS THAN E(FSRC) TEST
14733                                  ;*****************************************************************************
14734  066020                          TS463:
14735                                  ;EXPONENT DIFFERENCE=57=71 (OCT) FD=1
14736  066020  012704  003200                  MOV     #3200,R4        ;SET FIV,FIV, AND FD
14737  066024  170104                          LDFPS   R4
14738  066026  012700  066474                  MOV     #CCP0,R0        ;SET AC0 OPERAND
14739  066032  172410                          LDD     (R0),AC0                ;AC0
14740  066034  012700  066514                  MOV     #CCP2,R0
14741  066040  172010                  CCX2:   ADDD    (R0),AC0        ;TEST INSTRUCTION
14742  066042  170205                          STFPS   R5              ;GET FPS
14743  066044  012700  066464                  MOV     #CCDAT0,R0      ;GET THE RESULT
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14744  066050  174010                        STD     AC0,(R0)
14745  066052  012701  066514                MOV     #CCP2,R1        ;IS IT CORRECT
14746  066056  012702  000004                MOV     #4,R2
14747  066062  022021                CCX3:   CMP     (R0)+,(R1)+
14748  066064  001401                        BEQ     CCX6
14749  066066  104000                        EMT                     ;
14750  066070  077204                CCX6:   SOB     R2,CCX3
14751  066072  020405                        CMP     R4,R5           ;FPS CORRECT?
14752  066074  001401                        BEQ     CCX7
14753  066076  104000                        EMT                     ;
14754                                ;EXPONENT DIFFERENCE=56=70 (OCT) FD=1
14755  066100  012704  003200        CCX7:   MOV     #3200,R4        ;SET FIV,FIV, AND FD
14756  066104  170104                        LDFPS   R4
14757  066106  012700  066474                MOV     #CCP0,R0        ;SET AC0 OPERAND
14758  066112  172410                        LDD     (R0),AC0
14759  066114  012700  066504                MOV     #CCP1,R0        ;FSRC
14760  066120  172010                CCX8:   ADDD    (R0),AC0        ;TEST INSTRUCTION
14761  066122  170205                        STFPS   R5              ;GET FPS
14762  066124  012700  066464                MOV     #CCDAT0,R0      ;GET THE RESULT
14763  066130  174010                        STD     AC0,(R0)
14764  066132  012701  066564                MOV     #CCP7,R1        ;IS IT CORRECT
14765  066136  012702  000004                MOV     #4,R2
14766  066142  022021                CCX9:   CMP     (R0)+,(R1)+
14767  066144  001401                        BEQ     CCX12
14768  066146  104000                        EMT                     ;
14769  066150  077204                CCX12:  SOB     R2,CCX9
14770  066152  020405                        CMP     R4,R5           ;FPS CORRECT?
14771  066154  001401                        BEQ     CCX13
14772  066156  104000                        EMT                     ;
14773                                ;EXPONENT DIFFERENCE=25=31 (OCT) FD=0
14774  066160  012700  066474        CCX13:  MOV     #CCP0,R0        ;SET UP AC0 OPERAND.
14775  066164  172410                        LDD     (R0),AC0
14776  066166  012704  003000                MOV     #3000,R4        ;SET FIV,FIV. CLEAR FD.
14777  066172  170104                        LDFPS   R4
14778  066174  012700  066554                MOV     #CCP6,R0        ;FSRC
14779  066200  172010                CCX14:  ADDF    (R0),AC0        ;TEST INSTRUCTION
14780  066202  170205                        STFPS   R5
14781  066204  170011                        SETD                    ;REENTER DOUBLE MOVE
14782  066206  012700  066464                MOV     #CCDAT0,R0      ;GET THE RESULT
14783  066212  174010                        STD     AC0,(R0)
14784  066214  012701  066554                MOV     #CCP6,R1        ;IS THE RESULT CORRECT?
14785  066220  012702  000002                MOV     #2,R2
14786  066224  022021                CCX15:  CMP     (R0)+,(R1)+
14787  066226  001401                        BEQ     CCX18
14788  066230  104000                        EMT                     ;
14789  066232  077204                CCX18:  SOB     R2,CCX15
14790  066234  020405                        CMP     R4,R5
14791  066236  001401                        BEQ     CCX19
14792  066240  104000                        EMT                     ;
14793                                ;EXPONENT DIFFERENCE=24=30 (OCT) FD=0
14794  066242  012700  066524        CCX19:  MOV     #CCP3,R0        ;SET UP AC0 OPERAND.
14795  066246  172410                        LDD     (R0),AC0
14796  066250  012704  003000                MOV     #3000,R4        ;SET FIV,FIV. CLEAR FD.
14797  066254  170104                        LDFPS   R4
14798  066256  012700  066544                MOV     #CCP5,R0        ;FSRC
14799  066262  172010                CCX20:  ADDF    (R0),AC0        ;TEST INSTRUCTION
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14800  066264  170205                    STFPS   R5
14801  066266  170011                    SETD                    ;REENTER DOUBLE MOVE
14802  066270  012700  066464            MOV     #CCDATO,R0      ;GET THE RESULT
14803  066274  174010                    STD     AC0,(R0)
14804  066276  012701  066574            MOV     #CCP10,R1       ;IS THE RESLT CORRECT?
14805  066302  012702  000002            MOV     #2,R2
14806  066306  022021            CCX21:  CMP     (R0)+,(R1)+
14807  066310  001401                    BEQ     CCX24
14808  066312  104000                    EMT                     ;
14809  066314  077204            CCX24:  SOB     R2,CCX21
14810  066316  020405                    CMP     R4,R5
14811  066320  001401                    BEQ     CCX25
14812  066322  104000                    EMT                     ;
14813                            ;EXPONENT DIFFERENCE=1 FD=1
14814  066324  012704  003200    CCX25:  MOV     #3200,R4        ;SET FIV,FIV, AND FD
14815  066330  170104                    LDFPS   R4
14816  066332  012700  066474            MOV     #CCP0,R0        ;SET AC0 OPERAND
14817  066336  172410                    LDD     (R0),AC0
14818  066340  012700  066524            MOV     #CCP3,R0        ;FSRC
14819  066344  172010            CCX26:  ADDD    (R0),AC0        ;TEST INSTRUCTION
14820  066346  170205                    STFPS   R5              ;GET FPS
14821  066350  012700  066464            MOV     #CCDATO,R0      ;GET THE RESULT
14822  066354  174010                    STD     AC0,(R0)
14823  066356  012701  066604            MOV     #CCP11,R1       ;IS IT CORRECT
14824  066362  012702  000004            MOV     #4,R2
14825  066366  022021            CCX27:  CMP     (R0)+,(R1)+
14826  066370  001401                    BEQ     CCX30
14827  066372  104000                    EMT                     ;
14828  066374  077204            CCX30:  SOB     R2,CCX27
14829  066376  020405                    CMP     R4,R5           ;FPS CORRECT?
14830  066400  001401                    BEQ     CCX31
14831  066402  104000                    EMT                     ;
14832                            ;EXPONENT DIFFERENCE=100=144 (OCT) FD=1
14833  066404  012704  003200    CCX31:  MOV     #3200,R4        ;SET FIV,FIV, AND FD
14834  066410  170104                    LDFPS   R4
14835  066412  012700  066474            MOV     #CCP0,R0        ;SET AC0 OPERAND
14836  066416  172410                    LDD     (R0),AC0
14837  066420  012700  066534            MOV     #CCP4,R0        ;FSRC
14838  066424  172010            CCX32:  ADDD    (R0),AC0        ;TEST INSTRUCTION
14839  066426  170205                    STFPS   R5              ;GET FPS
14840  066430  012700  066464            MOV     #CCDATO,R0      ;GET THE RESULT
14841  066434  174010                    STD     AC0,(R0)
14842  066436  012701  066534            MOV     #CCP4,R1        ;IS IT CORRECT
14843  066442  012702  000004            MOV     #4,R2
14844  066446  022021            CCX33:  CMP     (R0)+,(R1)+
14845  066450  001401                    BEQ     CCX36
14846  066452  104000                    EMT                     ;
14847  066454  077204            CCX36:  SOB     R2,CCX33
14848  066456  020405                    CMP     R4,R5           ;FPS CORRECT?
14849  066460  001461                    BEQ     CCXDONE
14850  066462  104000                    EMT                     ;
14851  066464  000000            CCDATO: 0
14852  066466  000000                    0
14853  066470  000000                    0
14854  066472  000000                    0
14855  066474  000200            CCP0:   200                     ;E(AC)=1
```

```
14856  066476  000000                          0
14857  066500  000000                          0
14858  066502  000000                          0
14859  066504  016200          CCP1:   16200                   ;E(FSRC)=E(AC)+56=57
14860  066506  000000                  0       ;                       =71(OCT)
14861  066510  000000                          0
14862  066512  000000                          0
14863  066514  016400          CCP2:   16400                   ;E(FSRC)=E(AC)+57=58
14864  066516  000000                  0       ;                       =72(OCT)
14865  066520  000000                          0
14866  066522  000000                          0
14867  066524  000400          CCP3:   400                     ;E(FSRC)=E(AC)+1=2
14868  066526  000000                  0
14869  066530  000000                          0
14870  066532  000000                          0
14871  066534  031200          CCP4:   31200                   ;E(FSRC)=E(AC)+100=101=145(OCT)
14872  066536  000000                  0
14873  066540  000000                          0
14874  066542  000000                          0
14875  066544  006200          CCP5:   6200                    ;E(FSRC)=E(AC)+24=25=31(OCT)
14876  066546  000000                  0
14877  066550  000000                          0
14878  066552  000000                          0
14879  066554  006400          CCP6:   6400                    ;E(FSRC)=E(AC)+25=26=32(OCT)
14880  066556  000000                  0
14881  066560  000000                          0
14882  066562  000000                          0
14883  066564  016200          CCP7:   16200                   ;CCP1 RES
14884  066566  000000                  0
14885  066570  000000                          0
14886  066572  000001                          1
14887  066574  006200          CCP10:  6200                    ;CCP5 RES
14888  066576  000001                  1
14889  066600  000000                          0
14890  066602  000000                          0
14891  066604  000500          CCP11:  500                     ;CCP3 RES
14892  066606  000000                  0
14893  066610  000000                          0
14894  066612  000000                          0
14895  066614  000200          CCP12:  200                     ;BAD CONSTANT
14896  066616  000000                  0       ;RES CCP2,CCP4
14897  066620  000000                          0
14898  066622  000000                          0
14899
14900  066624                  CCXDONE:
14901  066624  004767  035742            JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
14902                                                          ;SEE IF THE USER HAS EXPRESSED
14903                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
14904                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
14905                                                          ;THE USER TYPED CONTROL G?).
14906
14907                          ;*****************************************************************************
14908                          ;TEST 464       ADDF AND ADDD WITH E(AC) GREATER THAN E(FSRC) TEST
14909                          ;*****************************************************************************
14910  066630                  TS464:
14911                          ;EXPONENT DIFFERENCE=57=71 (OCT) FD=1
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14912  066630  012704  003200          MOV     #3200,R4        ;SET FIV FIV, AND FD
14913  066634  170104                  LDFPS   R4
14914  066636  012700  067324          MOV     #BBPAT2,R0      ;SET AC0 OPERAND.
14915  066642  172410                  LDD     (R0),AC0
14916  066644  012700  067314          MOV     #BBPAT1,R0      ;FSRC
14917  066650  172010          BB2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
14918  066652  170205                  STFPS   R5
14919  066654  012700  067274          MOV     #BBDAT0,R0      ;GET THE RESULT
14920  066660  174010          BB3:    STD     AC0,(R0)
14921  066662  012701  067324          MOV     #BBPAT2,R1      ;RESULT CORRECT?
14922  066666  012702  000004          MOV     #4,R2
14923  066672  022021          BB4:    CMP     (R0)+,(R1)+
14924  066674  001401                  BEQ     BB5
14925  066676  104000                  EMT                     ;
14926  066700  077204          BB5:    SOB     R2,BB4
14927                                                          ;WAS FPS CORRECT?
14928  066702  020405                  CMP     R4,R5
14929  066704  001401                  BEQ     BB6
14930  066706  104000                  EMT                     ;
14931          ;EXPONENT DIFFERENCE=56=70 (OCT) FD=1
14932  066710  012704  003200  BB6:    MOV     #3200,R4        ;SET FIV,FIV, AND FD
14933  066714  170104                  LDFPS   R4
14934  066716  012700  067344          MOV     #BBPAT4,R0      ;SET AC0 OPERAND
14935  066722  172410                  LDD     (R0),AC0
14936  066724  012700  067314          MOV     #BBPAT1,R0      ;FSRC
14937  066730  172010          BB7:    ADDD    (R0),AC0        ;TEST INSTRUCTION
14938  066732  170205                  STFPS   R5              ;GET FPS
14939  066734  012700  067274          MOV     #BBDAT0,R0      ;GET THE RESULT
14940  066740  174010                  STD     AC0,(R0)
14941  066742  012701  067404          MOV     #BBP10,R1       ;IS IT CORRECT
14942  066746  012702  000004          MOV     #4,R2
14943  066752  022021          BB10:   CMP     (R0)+,(R1)+
14944  066754  001401                  BEQ     BB13
14945  066756  104000                  EMT                     ;
14946  066760  077204          BB13:   SOB     R2,BB10
14947  066762  020405                  CMP     R4,R5           ;FPS CORRECT?
14948  066764  001401                  BEQ     BB14
14949  066766  104000                  EMT                     ;
14950          ;EXPONENT DIFFERENCE=25=31 (OCT) FD=0
14951  066770  012700  067304  BB14:   MOV     #BBPAT0,R0      ;SET UP AC0 OPERAND
14952  066774  172410                  LDD     (R0),AC0
14953  066776  012704  003000          MOV     #3000,R4        ;SET FIV AND FIV
14954                                                          ;CLEAR FD
14955  067002  170104                  LDFPS   R4
14956  067004  012700  067314          MOV     #BBPAT1,R0      ;FSRC
14957  067010  172010          BB15:   ADDF    (R0),AC0        ;TEST INSTRUCTION
14958  067012  170205                  STFPS   R5
14959  067014  170011                  SETD                    ;REENTED DOUBLE MODE.
14960  067016  012700  067274          MOV     #BBDAT0,R0      ;GET THE RESULT
14961  067022  174010                  STD     AC0,(R0)
14962  067024  012701  067304          MOV     #BBPAT0,R1      ;IS THE RESULT
14963  067030  012702  000002          MOV     #2,R2           ;CORRECT?
14964  067034  022021          BB16:   CMP     (R0)+,(R1)+
14965  067036  001401                  BEQ     BB17
14966  067040  104000                  EMT                     ;
14967  067042  077204          BB17:   SOB     R2,BB16
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14968  067044  020405                CMP     R4,R5           ;IS FPS CORRECT?
14969  067046  001401                BEQ     BB20
14970  067050  104000                EMT                     ;
14971                        ;EXPONENT DIFFERENCE=24=30 (OCT)
14972  067052  012700  067334  BB20: MOV     #BBPAT3,R0      ;SET UP AC0 OPERAND.
14973  067056  172410                LDD     (R0),AC0
14974  067060  012704  003000        MOV     #3000,R4        ;SET FIU,FIV. CLEAR FD.
14975  067064  170104                LDFPS   R4
14976  067066  012700  067314        MOV     #BBPAT1,R0      ;FSRC
14977  067072  172010        BB21:   ADDF    (R0),AC0        ;TEST INSTRUCTION
14978  067074  170205                STFPS   R5
14979  067076  170011                SETD                    ;REENTER DOUBLE MODE
14980  067100  012700  067274        MOV     #BBDAT0,R0      ;GET THE RESULT
14981  067104  174010                STD     AC0,(R0)
14982  067106  012701  067374        MOV     #BBP7,R1        ;IS THE RESULT CORRECT?
14983  067112  012702  000002        MOV     #2,R2
14984  067116  022021        BB22:   CMP     (R0)+,(R1)+
14985  067120  001401                BEQ     BB25
14986  067122  104000                EMT                     ;
14987  067124  077204        BB25:   SOB     R2,BB22
14988  067126  020405                CMP     R4,R5
14989  067130  001401                BEQ     BB26
14990  067132  104000                EMT                     ;
14991                        ;EXPONENT DIFFERENCE=1
14992  067134  012704  003200  BB26: MOV     #3200,R4
14993  067140  170104                LDFPS   R4              ;SET UP AC0 OPERAND
14994  067142  012700  067354        MOV     #BBPAT5,R0
14995  067146  172410                LDD     (R0),AC0
14996  067150  012700  067314        MOV     #BBPAT1,R0      ;FSRC
14997  067154  172010        BB27:   ADDD    (R0),AC0        ;TEST INSTRUCTION
14998  067156  170205                STFPS   R5
14999  067160  012700  067274        MOV     #BBDAT0,R0      ;GET THE RESULT.
15000  067164  174010                STD     AC0,(R0)
15001  067166  012701  067414        MOV     #BBP11,R1       ;IS IT CORRECT?
15002  067172  012702  000004        MOV     #4,R2
15003  067176  022021        BB30:   CMP     (R0)+,(R1)+
15004  067200  001401                BEQ     BB31
15005  067202  104000                EMT                     ;
15006  067204  077204        BB31:   SOB     R2,BB30
15007  067206  020405                CMP     R4,R5           ;IS FPS CORRECT
15008  067210  001401                BEQ     BB32
15009  067212  104000                EMT                     ;
15010                        ;EXPONENT DIFFERENCE=100=144 (OCT)
15011  067214  012704  003200  BB32: MOV     #3200,R4
15012  067220  170104                LDFPS   R4              ;SET FIV,FIV AND FD
15013  067222  012700  067364        MOV     #BBPAT6,R0      ;SET UP AC0 OPERAND.
15014  067226  172410                LDD     (R0),AC0
15015  067230  012700  067314        MOV     #BBPAT1,R0      ;FSRC
15016  067234  172010        BB33:   ADDD    (R0),AC0        ;TEST INSTRUCTION
15017  067236  170205                STFPS   R5
15018  067240  012700  067274        MOV     #BBDAT0,R0      ;GET THE RESULT
15019  067244  174010                STD     AC0,(R0)
15020  067246  012701  067364        MOV     #BBPAT6,R1      ;IS IT CORRECT
15021  067252  012702  000004        MOV     #4,R2
15022  067256  022021        BB34:   CMP     (R0)+,(R1)+
15023  067260  001401                BEQ     BB35
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15024  067262  '04000          EMT                     ;
15025  067264  077204  BB35:   SOB     R2,BB34
15026  067266  020405          CMP     R4,R5           ;IS FPS CORRECT
15027  067270  001455          BEQ     BBDONE
15028  067272  104000          EMT                     ;
15029  067274  000000  BBDAT0: 0
15030  067276  000000          0
15031  067300  000000          0
15032  067302  000000          0
15033  067304  006400  BBPAT0: 6400                    ;F(AC)=E(FSRC)+25=26
15034  067306  000000          0                       ;                 =32(OCT)
15035  067310  000000          0
15036  067312  000000          0
15037  067314  000200  BBPAT1: 200
15038  067316  000000          0                       ;E(FSRC)=1
15039  067320  000000          0
15040  067322  000000          0
15041  067324  016400  BBPAT2: 16400
15042  067326  000000          0                       ;E(AC)=E(FSRC)+57=58
15043  067330  000000          0                       ;                 =72(OCT)
15044  067332  000000          0
15045  067334  006200  BBPAT3: 6200                    ;E(AC)=E(FSRC)+24=25
15046  067336  000000          0                       ;                 =31(OCT)
15047  067340  000000          0
15048  067342  000000          0
15049  067344  016200  BBPAT4: 16200                   ;E(AC)=E(FSR6)+56=57
15050  067346  000000          0                       ;                 =71(OCT)
15051  067350  000000          0
15052  067352  000000          0
15053  067354  000400  BBPAT5: 400                     ;E(AC)=E(FSRC)+1=2
15054  067356  000000          0
15055  067360  000000          0
15056  067362  000000          0
15057  067364  031200  BBPAT6: 31200                   ;E(AC)=E(FSRC)+100=101
15058  067366  000000          0                       ;                  =145(OCT)
15059  067370  000000          0
15060  067372  000000          0
15061  067374  006200  BBP7:   6200                    ;BBPAT3 RES
15062  067376  000001          1
15063  067400  000000          0
15064  067402  000000          0
15065  067404  016200  BBP10:  16200                   ;BBPAT4 RES
15066  067406  000000          0
15067  067410  000000          0
15068  067412  000001          1
15069  067414  000500  BBP11:  500                     ;BBPAT5 RES
15070  067416  000000          0
15071  067420  000000          0
15072  067422  000000          0
15073  067424          BBDONE:
15074  067424  004767  035142          JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
15075                                                          ;SEE IF THE USER HAS EXPRESSED
15076                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
15077                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
15078                                                          ;THE USER TYPED CONTROL G?).
15079                          ;*****************************************************************************
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15080
15081
15082  067430
15083
15084  067430  012704  003200          ;TEST 465       ADDD WITH NEGATIVE OPRANDS TEST
15085  067434  170104                  ;*****************************************************************************
15086  067436  012700  070214          TS465:
15087  067442  172410                  ;BOTH OPERANDS NEGATIVE
15088  067444  012700  070214                  MOV     #3200,R4        ;SET FIO, FIV, AND FD
15089  067450  172010                          LDFPS   R4
15090  067452  170205                          MOV     #DDP1,R0                ;SET AC0 OPERAND
15091  067454  012700  070174                  LDD     (R0),AC0
15092  067460  174010                          MOV     #DDP1,R0                ;ESRC
15093  067462  012701  070314          DD2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
15094  067466  012702  000004                  STFPS   R5                      ;GET FPS
15095  067472  022021                          MOV     #DDDATO,R0              ;GET THE RESULT
15096  067474  001401                          STD     AC0,(R0)
15097  067476  104000                          MOV     #DDP9,R1                ;IS IT CORRECT
15098  067500  077204                          MOV     #4,R2
15099  067502  052704  000010          DD3:    CMP     (R0)+,(R1)+
15100  067506  020405                          BEQ     DD6
15101  067510  001401                          EMT                     ;
15102  067512  104000                  DD6:    SOB     R2,DD3
15103                                           BIS     #10,R4
15104  067514  012704  003200                  CMP     R4,R5                   ;FPS CORRECT?
15105  067520  170104                          BEQ     DD7
15106  067522  012700  070224                  EMT                     ;
15107  067526  172410                  ;AC POS FSRC NEG        AC=-FSRC
15108  067530  012700  070214          DD7:    MOV     #3200,R4                ;SET FIO, FIV, AND FD
15109  067534  172010                          LDFPS   R4
15110  067536  170205                          MOV     #DDP2,R0                ;SET AC0 OPERAND
15111  067540  012700  070174                  LDD     (R0),AC0
15112  067544  174010                          MOV     #DDP1,R0                ;FSPC
15113  067546  012701  070204          DD8:    ADDD    (R0),AC0                ;TEST INSTRUCTION
15114  067552  012702  000004                  STFPS   R5                      ;GET FPS
15115  067556  022021                          MOV     #DDDATO,R0              ;GET THE RESULT
15116  067560  001401                          STD     AC0,(R0)
15117  067562  104000                          MOV     #DDP0,R1                ;IS IT CORRECT
15118  067564  077204                          MOV     #4,R2
15119  067566  052704  000004          DD10:   CMP     (R0)+,(R1)+
15120  067572  020405                          BEQ     DD11
15121  067574  001401                          EMT                     ;
15122  067576  104000                  DD11:   SOB     R2,DD10
15123                                           BIS     #4,R4
15124  067600  012704  003200                  CMP     R4,R5                   ;FPS CORRECT?
15125  067604  170104                          BEQ     DD12
15126  067606  012700  070214                  EMT                     ;
15127  067612  172410                  ;AC NEG FSRC POS                AC=-FSRC
15128  067614  012700  070224          DD12:   MOV     #3200,R4                ;SET FIU, FIV, AND FD
15129  067620  172010                          LDFPS   R4
15130  067622  170205                          MOV     #DDP1,R0                ;SET AC0 OPERAND
15131  067624  012700  070174                  LDD     (R0),AC0
15132  067630  174010                          MOV     #DDP2,R0                ;FSRC
15133  067632  012701  070204          DD13:   ADDD    (R0),AC0                ;TEST INSTRUCTION
15134  067636  012702  000004                  STFPS   R5                      ;GET FPS
15135  067642  022021                          MOV     #DDDATO,R0              ;GET THE RESULT
                                                STD     AC0,(R0)
                                                MOV     #DDP0,R1                ;IS IT CORRECT
                                                MOV     #4,R2
                                        DD14:   CMP     (R0)+,(R1)+
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15136  067644  001401                        BEQ     DD15
15137  067646  104000                        EMT                             ;
15138  067650  077204                DD15:   SOB     R2,DD14
15139  067652  052704  000004                BIS     #4,R4
15140  067656  020405                        CMP     R4,R5                   ;EPS CORRECT?
15141  067660  001401                        BEQ     DD16
15142  067662  104000                        EMT                             ;
15143                                ;AC0 POC        FSRC    NEG     /AC/ > /FSRC/
15144  067664  012704  003200        DD16:   MOV     #3200,R4                ;SET FIV, FIV AND FD
15145  067670  170104                        LDFPS   R4
15146  067672  012700  070234                MOV     #DDP3,R0                ;SET AC0 OPERAND
15147  067676  172410                        LDD     (R0),AC0
15148  067700  012700  070264                MOV     #DDP6,R0                ;ESPC
15149  067704  172010                DD17:   ADDD    (R0),AC0                ;TEST INSTRUCTION
15150  067706  170205                        STFPS   R5                      ;GET FPS
15151  067710  012700  070174                MOV     #DDDAT0,R0              ;GET THE RESULT
15152  067714  174010                        STD     AC0,(R0)
15153  067716  012701  070274                MOV     #DDP7,R1                ;IS IT CORRECT
15154  067722  012702  000004                MOV     #4,R2
15155  067726  022021                DD18:   CMP     (R0)+,(R1)+
15156  067730  001401                        BEQ     DD21
15157  067732  104000                        EMT                             ;
15158  067734  077204                DD21:   SOB     R2,DD18
15159  067736  020405                        CMP     R4,R5                   ;EPS CORRECT?
15160  067740  001401                        BEQ     DD22
15161  067742  104000                        EMT                             ;
15162                                ;AC NEG FSRC    POS     /FSRC/ > /AC/
15163  067744  012704  003200        DD22:   MOV     #3200,R4                ;SET FIO,FIV, AND FD
15164  067750  170104                        LDFPS   R4
15165  067752  012700  070264                MOV     #DDP6,R0                ;SET AC0 OPERAND
15166  067756  172410                        LDD     (R0),AC0
15167  067760  012700  070234                MOV     #DDP3,R0                ;FSPC
15168  067764  172010                DD23:   ADDD    (R0),AC0                ;TEST INSTRUCTION
15169  067766  170205                        STFPS   R5                      ;GET FPS
15170  067770  012700  070174                MOV     #DDDAT0,R0              ;GET THE RESULT
15171  067774  174010                        STD     AC0,(R0)
15172  067776  012701  070274                MOV     #DDP7,R1                ;IS IT CORRECT?
15173  070002  012702  000004                MOV     #4,R2
15174  070006  022021                DD24:   CMP     (R0)+,(R1)+
15175  070010  001401                        BEQ     DD27
15176  070012  104000                        EMT                             ;
15177  070014  077204                DD27:   SOB     R2,DD24
15178  070016  020405                        CMP     R4,R5                   ;FPS CORRECT?
15179  070020  001401                        BEQ     DD30
15180  070022  104000                        EMT                             ;
15181                                ;AC0 POS        FSRC    NEG     /AC/</FRSRC/
15182  070024  012704  003200        DD30:   MOV     #3200,R4                ;SET FIO,FIV,AND FD
15183  070030  170104                        LDFPS   R4
15184  070032  012700  070244                MOV     #DDP4,R0                ;SET AC0 OPERAND
15185  070036  172410                        LDD     (R0),AC0
15186  070040  012700  070254                MOV     #DDP5,R0                ;FSPC
15187  070044  172010                DD31:   ADDD    (R0),AC0                ;TEST INSTRUCTION
15188  070046  170205                        STFPS   R5                      ;GET FPS
15189  070050  012700  070174                MOV     #DDDAT0,R0              ;GET THE RESULT
15190  070054  174010                        STD     AC0,(R0)
15191  070056  012701  070304                MOV     #DDP8,R1                ;IS IT CORRECT
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15192  070062  012702  000004          MOV     #4,R2
15193  070066  022021          DD32:   CMP     (R0)+,(R1)+
15194  070070  001401                  BEQ     DD35
15195  070072  104000                  EMT                             ;
15196  070074  077204          DD35:   SOB     R2,DD32
15197  070076  052704  000010          BIS     #10,R4
15198  070102  020405                  CMP     R4,R5                   ;FPS CORRECT?
15199  070104  001401                  BEQ     DD36
15200  070106  104000                  EMT                             ;
15201                          ;AC0 NEG        FSRC    POS             /FSRC/</AC/
15202  070110  012704  003200  DD36:   MOV     #3200,R4                ;SET FIO, FIV, AND FD
15203  070114  170104                  LDFPS   R4
15204  070116  012700  070254          MOV     #DDP5,R0                ;SET AC0 OPERAND
15205  070122  172410                  LDD     (R0),AC0
15206  070124  012700  070244          MOV     #DDP4,R0                ;FSPC
15207  070130  172010          DD37:   ADDD    (R0),AC0                ;TEST INSTRUCTION
15208  070132  170205                  STFPS   R5                      ;GET FPS
15209  070134  012700  070174          MOV     #DDDATO,R0              ;GET THE RESULT
15210  070140  174010                  STD     AC0,(R0)
15211  070142  012701  070304          MOV     #DDP8,R1                ;IS IT CORRECT
15212  070146  012702  000004          MOV     #4,R2
15213  070152  022021          DD38:   CMP     (R0)+,(R1)+
15214  070154  001401                  BEQ     DD41
15215  070156  104000                  EMT                             ;
15216  070160  077204          DD41:   SOB     R2,DD38
15217  070162  052704  000010          BIS     #10,R4
15218  070166  020405                  CMP     R4,R5                   ;FPS CORRECT?
15219  070170  001455                  BEQ     DDDONE
15220  070172  104000                  EMT                             ;
15221  070174  000000          DDDATO: 0
15222  070176  000000                  0
15223  070200  000000                  0
15224  070202  000000                  0
15225  070204  000000          DDP0:   0
15226  070206  000000                  0
15227  070210  000000                  0
15228  070212  000000                  0
15229  070214  100200          DDP1:   100200                          ;-DDP2
15230  070216  000000                  0
15231  070220  000000                  0
15232  070222  000000                  0
15233  070224  000200          DDP2:   200                             ;-DDP1
15234  070226  000000                  0
15235  070230  000000                  0
15236  070232  000000                  0
15237  070234  001100          DDP3:   1100                            ;EXP=4
15238  070236  000000                  0                               ;FRAC=...110...
15239  070240  000000                  0
15240  070242  000000                  0
15241  070244  000600          DDP4:   600                             ;EXP=3
15242  070246  000000                  0                               ;FRAC=...100...
15243  070250  000000                  0
15244  070252  000000                  0
15245  070254  101100          DDP5:   101100                          ;-DDP3
15246  070256  000000                  0
15247  070260  000000                  0
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15248  070262  000000                          0
15249  070264  100600          DDP6:   100600                  ;-DDP4
15250  070266  000000                  0
15251  070270  000000                  0
15252  070272  000000                  0
15253  070274  001000          DDP7:   1000                    ;DDP3+DDP6
15254  070276  000000                  0
15255  070300  000000                  0
15256  070302  000000                  0
15257  070304  101000          DDP8:   101000                  ;DDP5+DDP4
15258  070306  000000                  0
15259  070310  000000                  0
15260  070312  000000                  0
15261  070314  100400          DDP9:   100400                  ;DDP1+DDP1
15262  070316  000000                  0
15263  070320  000000                  0
15264  070322  000000                  0
15265  070324                  DDDONE:
15266  070324  004767  034242          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
15267                                                          ;SEE IF THE USER HAS EXPRESSED
15268                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
15269                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
15270                                                          ;THE USER TYPED CONTROL G?).
15271          ;*********************************************************************************
15272          ;TEST 466       SUBD TEST
15273          ;*********************************************************************************
15274  070330                  TS466:
15275                          ;       USE POSITIVE OPERANDS
15276  070330  012704  003200          MOV     #3200,R4                ;SET FIU, FIV, AND FD
15277  070334  170104                  LDFPS   R4
15278  070336  012700  070522          MOV     #EEP1,R0                ;SET AC0 OPERAND
15279  070342  172410                  LDD     (R0),AC0
15280  070344  012700  070522          MOV     #EEP1,R0                ;FSPC
15281  070350  173010          EE2:    SUBD    (R0),AC0                ;TEST INSTRUCTION
15282  070352  170205                  STFPS   R5                      ;GET FPS
15283  070354  012700  070500          MOV     #EEDAT0,R0              ;GET THE RESULT
15284  070360  174010                  STD     AC0,(R0)
15285  070362  012701  070510          MOV     #EEP0,R1                ;IS IT CORRECT?
15286  070366  012702  000004          MOV     #4,R2
15287  070372  022021          EE3:    CMP     (R0)+,(R1)+
15288  070374  001401                  BEQ     EE6
15289  070376  104000                  EMT                     ;
15290  070400  077204          EE6:    SOB     R2,EE3
15291  070402  052704  000004          BIS     #4,R4
15292  070406  020405                  CMP     R4,R5                   ;FPS CORRECT?
15293  070410  001401                  BEQ     EE7
15294  070412  104000                  EMT                     ;
15295                                  ;USE NEGATIVE OPERANDS
15296  070414  012704  003200          EE7:    MOV     #3200,R4                ;SET FIO, FIV, AND FD
15297  070420  170104                  LDFPS   R4
15298  070422  012700  070542          MOV     #EEP3,R0                ;SET AC0 OPERAND
15299  070426  172410                  LDD     (R0),AC0
15300  070430  012700  070542          MOV     #EEP3,R0                ;FSPC
15301  070434  173010          EE8:    SUBD    (R0),AC0                ;TEST INSTRUCTION
15302  070436  170205                  STFPS   R5                      ;GET FPS
15303  070440  012700  070500          MOV     #EEDAT0,R0              ;GET THE RESULT
```

```
15304  070444  174010                  STD     AC0,(R0)
15305  070446  012701  070510          MOV     #EEP0,R1                ;IS IT CORRECT?
15306  070452  012702  000004          MOV     #4,R2
15307  070456  022021          EE9:    CMP     (R0)+,(R1)+
15308  070460  001401                  BEQ     EE12
15309  070462  104000                  EMT                             ;
15310  070464  077204          EE12:   SOB     R2,EE9
15311  070466  052704  000004          BIS     #4,R4
15312  070472  020405                  CMP     R4,R5                   ;FPS CORRECT?
15313  070474  001432                  BEQ     EEDONE
15314  070476  104000                  EMT                             ;
15315  070500  000000          EEDATO: 0
15316  070502  000000                  0
15317  070504  000000                  0
15318  070506  000000                  0
15319  070510  000000          EEP0:   0
15320  070512  000000                  0
15321  070514  000000                  00000
15322  070516  000000                  0
15323  070520  000000                  0
15324  070522  000200          EEP1:   200
15325  070524  000000                  0
15326  070526  000000                  0
15327  070530  000000                  0
15328  070532  000400          EEP2:   400
15329  070534  000000                  0
15330  070536  000000                  0
15331  070540  000000                  0
15332  070542  100200          EEP3:   100200
15333  070544  000000                  0
15334  070546  000000                  0
15335  070550  000000                  0
15336  070552  100400          EEP4:   100400
15337  070554  000000                  0
15338  070556  000000                  0
15339  070560  000000                  0
15340  070562                  EEDONE:
15341  070562  004767  034004          JSR     PC,..RSET               ;GO INITIALIZE THE FPS AND STACK; AND
15342                                                                  ;SEE IF THE USER HAS EXPRESSED
15343                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
15344                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
15345                                                                  ;THE USER TYPED CONTROL G?).
15346          ;*****************************************************************************************
15347          ;TEST 467       NORMALIZE ALGORITHM TEST
15348          ;*****************************************************************************************
15349  070566  TS467:
15350          ;USE DATA PATTERNS THAT REQUIRE ONLY ONE LEFT SHIFT TO NORMALIZE
15351  070566  012704  003200          MOV     #3200,R4                ;SET FIO, FIV, AND FD
15352  070572  170104                  LDFPS   R4
15353  070574  012700  070756          MOV     #FFP2,R0                ;SET AC0 OPERAND
15354  070600  172410                  LDD     (R0),AC0
15355  070602  012700  070766          MOV     #FFP3,R0                ;FSPC
15356  070606  172010          FF2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
15357  070610  170205                  STFPS   R5                      ;GET FPS
15358  070612  012700  070726          MOV     #FFDATO,R0              ;GET THE RESULT
15359  070616  174010                  STD     AC0,(R0)
```

```
 15360  070620  012701  070776          MOV     #FFP4, R1               ;IS IT CORRECT
```

```
15361  070624  012702  000004          MOV     #4,R2
15362  070630  022021          FF3:    CMP     (R0)+,(R1)+
15363  070632  001401                  BEQ     FF4
15364  070634  104000                  EMT                             ;
15365  070636  077204          FF4:    SOB     R2,FF3
15366  070640  020405                  CMP     R4,R5                   ;FPS CORRECT?
15367  070642  001401                  BEQ     FF5
15368  070644  104000                  EMT                             ;
15369                          ;USE DATA PATTERNS WHICH REQUIRE 56 LEFT SHIFTS TO NORMALIZE
15370                          ;THE RESULT
15371  070646  012704  003200  FF5:    MOV     #3200,R4                ;SET FIU, FIV, AND FD
15372  070652  170104                  LDFPS   R4
15373  070654  012700  070736          MOV     #FFP0,R0                ;SET AC0 OPERAND
15374  070660  172410                  LDD     (R0),AC0
15375  070662  012700  070746          MOV     #FFP1,R0                ;FSRC
15376  070666  172010          FF6:    ADDD    (R0),AC0                ;TEST INSTRUCTION
15377  070670  170205                  STFPS   R5                      ;GET FPS
15378  070672  012700  070726          MOV     #FFDAT0,R0              ;GET THE RESULT
15379  070676  174010                  STD     AC0,(R0)
15380  070700  012701  070776          MOV     #FFP4,R1                ;IS IT CORRECT
15381  070704  012702  000004          MOV     #4,R2
15382  070710  022021          FF7:    CMP     (R0)+,(R1)+
15383  070712  001401                  BEQ     FF10
15384  070714  104000                  EMT                             ;
15385  070716  077204          FF10:   SOB     R2,FF7
15386  070720  020405                  CMP     R4,R5                   ;FPS CORRECT?
15387  070722  001431                  BEQ     FFDONE
15388  070724  104000                  EMT                             ;
15389
15390
15391  070726  000000          FFDAT0: 0
15392  070730  000000                  0
15393  070732  000000                  0
15394  070734  000000                  0
15395
15396  070736  016000          FFP0:   16000
15397  070740  000000                  0
15398  070742  000000                  0
15399  070744  000001                  1
15400  070746  116000          FFP1:   116000
15401  070750  000000                  0
15402  070752  000000                  0
15403  070754  000000                  0
15404  070756  000500          FFP2:   500
15405  070760  000000                  0
15406  070762  000000                  0
15407  070764  000000                  0
15408  070766  100400          FFP3:   100400
15409  070770  000000                  0
15410  070772  000000                  0
15411  070774  000000                  0
15412  070776  000200          FFP4:   200                             ;FFP4=FFP0+FFP1
15413  071000  000000                  0                               ;     =FFP3+FFP4
15414  071002  000000                  0
15415  071004  000000                  0
15416
```

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 15417  071006
 15418  071006  004767  033560          FFDONE:
                                               JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK, AND
 15419                                                                 ;SEE IF THE USER HAS EXPRESSED
 15420                                                                 ;THE DESIRE TO CHANGE THE SOFTWARE
 15421                                                                 ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 15422                                                                 ;THE USER TYPED CONTROL G?).
 15423
 15424
 15425
 15426                                 ;*****************************************************************************
 15427                                 ;*****************************************************************************
 15428                                 ;FLOATING POINT SECOND PART
 15429                                 ;*****************************************************************************
 15430                                 ;*****************************************************************************
 15431
 15432
 15433                                 ;*************************************************************************************************
 15434                                 ;TEST 470       ROUND\TRUNK TEST
 15435                                 ;*************************************************************************************************
 15436  071012                         TS470:
 15437
 15438                                         ;ROUND AND NORMALIZE TEST
 15439
 15440  071012  012704  003200                 MOV     #3200,R4                ;SET FIU, FIV, AND FD
 15441  071016  170104                         LDFPS   R4
 15442  071020  012700  071422                 MOV     #HHP0,R0                ;SET AC0 OPERAND
 15443  071024  172410                         LDD     (R0),AC0
 15444  071026  012700  071432                 MOV     #HHP1,R0                ;FSPC
 15445  071032  172010                 HH2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
 15446  071034  170205                         STFPS   R5                      ;GET FPS
 15447  071036  012700  071412                 MOV     #HHDAT0,R0              ;GET THE RESULT
 15448  071042  174010                         STD     AC0,(R0)
 15449  071044  012701  071442                 MOV     #HHP2,R1                ;IS IT CORRECT
 15450  071050  012702  000004                 MOV     #4,R2
 15451  071054  022021                 HH3:    CMP     (R0)+,(R1)+
 15452  071056  001401                         BEQ     HH6
 15453  071060  104000                         EMT                             ;
 15454  071062  077204                 HH6:    SOB     R2,HH3
 15455  071064  020405                         CMP     R4,R5                   ;FPS CORRECT?
 15456  071066  001401                         BEQ     HH7
 15457  071070  104000                         EMT                             ;
 15458
 15459                                         ;THIS IS A TEST OF THE ABILITY
 15460                                         ;OF NORMALIZE TO PRODUCE A ZERO EXP. AND
 15461                                         ;OF THE R\T ALGORITHM TO PROPERLY SET THE FPS
 15462
 15463  071072  012704  043200         HH7:    MOV     #043200,R4                      ;SET FIU,FIV,AND FD
 15464                                                                                 ;FID
 15465  071076  170104                         LDFPS   R4
 15466  071100  012700  071472                 MOV     #HHP5,R0                ;SET AC0 OPERAND
 15467  071104  172410                         LDD     (R0),AC0
 15468  071106  012700  071502                 MOV     #HHP6,R0                ;FSPC
 15469  071112  172010                 HH8:    ADDD    (R0),AC0                ;TEST INSTRUCTION
 15470  071114  170205                         STFPS   R5                      ;GET FPS
 15471  071116  012700  071412                 MOV     #HHDAT0,R0              ;GET THE RESULT
 15472  071122  174010                         STD     AC0,(R0)
```

```
15473  071124  012701  071462          MOV     #HHP4,R1                ;IS IT CORRECT
15474  071130  012702  000004          MOV     #4,R2
15475  071134  022021          HH9:    CMP     (R0)+,(R1)+
15476  071136  001401                  BEQ     HH10
15477  071140  104000                  EMT                     ;
15478  071142  077204          HH10:   SOB     R2,HH9
15479  071144  052704  100004          BIS     #100004,R4
15480  071150  020405                  CMP     R4,R5
15481  071152  001401                  BEQ     HH11
15482  071154  104000                  EMT                     ;
15483
15484                           ;THIS IS A TEST OF THE R\T ALGORITHN'S
15485                           ;ABILITY TO SET BOTH N AND Z ON A - 0 RESULT
15486  071156  012704  043200  HH11:   MOV     #043200,R4              ;SET FIV, FIV, AND FD
15487
15488  071162  170104          LDFPS   R4
15489  071164  012700  071522          MOV     #HHP8,R0                ;SET AC0 OPERAND
15490  071170  172410                  LDD     (R0),AC0
15491  071172  012700  071532          MOV     #HHP9,R0                ;FSPC
15492  071176  172010          HH12:   ADDD    (R0),AC0                ;TEST INSTRUCTION
15493  071200  170205                  STFPS   R5                      ;GET FPS
15494  071202  012700  071412          MOV     #HHDAT0,R0              ;GET THE RESULT
15495  071206  174010                  STD     AC0,(R0)
15496  071210  012701  071512          MOV     #HHP7,R1                ;IS IT CORRECT
15497  071214  012702  000004          MOV     #4,R2
15498  071220  022021          HH13:   CMP     (R0)+,(R1)+
15499  071222  001401                  BEQ     HH16
15500  071224  104000                  EMT                     ;
15501  071226  077204          HH16:   SOB     R2,HH13
15502  071230  052704  100014          BIS     #100014,R4              ;FPS CORRECT?
15503  071234  020405                  CMP     R4,R5
15504  071236  001401                  BEQ     HH17
15505  071240  104000                  EMT                     ;
15506                           ;TEST THAT CC ARE CLEARED BY R\T
15507  071242  012704  000200  HH17:   MOV     #00200,R4               ;SET FIV, FIV, AND FD
15508  07.246  170104                  LDFPS   R4
15509  071250  012700  071522          MOV     #HHP8,R0                ;SET AC0 OPERAND
15510  071254  172410                  LDD     (R0),AC0
15511  071256  012700  071522          MOV     #HHP8,R0                ;FSPC
15512  071262  172010          HH18:   ADDD    (R0),AC0                ;TEST INSTRUCTION
15513  071264  170205                  STFPS   R5                      ;GET FPS
15514  071266  012700  071412          MOV     #HHDAT0,R0              ;GET THE RESULT
15515  071272  174010                  STD     AC0,(R0)
15516  071274  012701  071542          MOV     #HHP10,R1               ;IS IT CORRECT
15517  071300  012702  000004          MOV     #4,R2
15518  071304  022021          HH19:   CMP     (R0)+,(R1)+
15519  071306  001401                  BEQ     HH20
15520  071310  104000                  EMT                     ;
15521  071312  077204          HH20:   SOB     R2,HH19
15522  071314  052704  000000          BIS     #00000,R4               ;FPS CORRECT?
15523  071320  020405                  CMP     R4,R5
15524  071322  001401                  BEQ     HH21
15525  071324  104000                  EMT                     ;
15526                           ;TEST THAT N IS SET BY R\T
15527  071326  012704  003200  HH21:   MOV     #3200,R4                ;SET FIV, FIV, AND FD
15528  071332  170104                  LDFPS   R4
```

```
15529  071334  012700  071472          MOV     #HHP5,R0                ;SET AC0 OPERAND
15530  071340  172410                  LDD     (R0),AC0
15531  071342  012700  071472          MOV     #HHP5,R0                ;FSPC
15532  071346  172010          HH22:   ADDD    (R0),AC0                ;TEST INSTRUCTION
15533  071350  170205                  STFPS   R5                      ;GET FPS
15534  071352  012700  071412          MOV     #HHDATO,R0              ;GET THE RESULT
15535  071356  174010                  STD     AC0,(R0)
15536  071360  012701  071552          MOV     #HHP11,R1               ;IS IT CORRECT
15537  071364  012702  000004          MOV     #4,R2
15538  071370  022021          HH23:   CMP     (R0)+,(R1)+
15539  071372  001401                  BEQ     HH24
15540  071374  104000                  EMT                     ;
15541  071376  077204          HH24:   SOB     R2,HH23
15542  071400  052704  000010          BIS     #10,R4
15543  071404  020405                  CMP     R4,R5                   ;FPS CORRECT?
15544  071406  001465                  BEQ     HHDONE
15545  071410  104000                  EMT                     ;
15546  071412  000000          HHDATO: 0
15547  071414  000000                  0
15548  071416  000000                  0
15549  071420  000000                  0
15550  071422  000452          HHP0:   452
15551  071424  125252                  125252
15552  071426  125252                  125252
15553  071430  125253                  125253
15554  071432  000252          HHP1:   252
15555  071434  125252                  125252
15556  071436  125252                  125252
15557  071440  125252                  125252
15558  071442  000600          HHP2:   600                     ;HHP0 + HHP1 WITH
15559  071444  000000                  0                       ;PROPER NORMALIZATION
15560  071446  000000                  0
15561  071450  000000                  0
15562  071452  000400          HHP3:   400                     ;HHP0 + HHP1 WITH
15563  071454  000000                  0                       ;BAD NORMALIZATION
15564  071456  000000                  0
15565  071460  000000                  0
15566  071462  000000          HHP4:   0
15567  071464  000000                  0
15568  071466  000000                  0
15569  071470  000000                  0
15570  071472  100200          HHP5:   100200
15571  071474  000000                  0
15572  071476  000000                  0
15573  071500  000000                  0
15574  071502  000300          HHP6:   300
15575  071504  000000                  0
15576  071506  000000                  0
15577  071510  000000                  0
15578  071512  100000          HHP7:   100000                  ;HHP7 = HHP8 + HHP9
15579  071514  000000                  0                       ;      = HHP5 + HHP6
15580  071516  000000                  0
15581  071520  000000                  0
15582  071522  000200          HHP8:   200
15583  071524  000000                  0
15584  071526  000000                  0
```

```
15585  071530  000000                          0
15586  071532  100300                  HHP9:   100300
15587  071534  000000                          0
15588  071536  000000                          0
15589  071540  000000                          0
15590  071542  000400                  HHP10:  400                     ;HHP10 = HHP8 + HHP8
15591  071544  000000                          0
15592  071546  000000                          0
15593  071550  000000                          0
15594  071552  100400                  HHP11:  100400                  ;HHP11 = HHP5 + HHP5
15595  071554  000000                          0
15596  071556  000000                          0
15597  071560  000000                          0
15598  071562                          HHDONE:
15599  071562  004767  033004                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
15600                                                                  ;SEE IF THE USER HAS EXPRESSED
15601                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
15602                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
15603                                                                  ;THE USER TYPED CONTROL G?).
15604
15605
15606                                  ;*********************************************************************************************
15607                                  ;TEST 471       OVER\UNDER TEST
15608                                  ;*********************************************************************************************
15609  071566                          TS471:
15610
15611                                  ;TEST OVERFLOW CONDITION WITH TRAP DISABLER FIV=0
15612  071566  012704  000200                  MOV     #200,R4         ;CLEAR FIU, FIV, AND SET FD
15613  071572  170104                          LDFPS   R4
15614  071574  012737  071712  000244          MOV     #GGER0,@#FPVECT
15615  071602  012700  072514                  MOV     #GGP5,R0        ;SET AC0 OPERAND
15616  071606  172410                          LDD     (R0),AC0
15617  071610  012700  072514                  MOV     #GGP5,R0        ;FSRC
15618  071614  172010                  GG2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
15619  071616  170205                          STFPS   R5              ;GET FPS
15620  071620  012700  072444                  MOV     #GGDAT0,R0      ;GET THE RESULT
15621  071624  174010                          STD     AC0,(R0)
15622  071626  012701  072524                  MOV     #GGP6,R1        ;IS IT CORRECT
15623  071632  012702  000004                  MOV     #4,R2
15624  071636  022021                  GG3:    CMP     (R0)+,(R1)+
15625  071640  001401                          BEQ     GG4
15626  071642  104000                          EMT                     ;
15627  071644  077204                  GG4:    SOB     R2,GG3
15628  071646  052704  000006                  BIS     #6,R4           ;FPS CORRECT?
15629  071652  020405                          CMP     R4,R5
15630  071654  001401                          BEQ     GG5
15631  071656  104000                          EMT                     ;
15632                                          ;TEST OVERFLOW WITH TRAPS ENABLED
15633                                          ;FIV = 1
15634  071660  012704  001200          GG5:    MOV     #1200,R4        ;CLEAR FIU, SET FIV, AND FD
15635  071664  170104                          LDFPS   R4
15636  071666  012737  071714  000244          MOV     #GG7,@#FPVECT
15637  071674  012700  072514                  MOV     #GGP5,R0        ;SET AC0 OPERAND
15638  071700  172410                          LDD     (R0),AC0
15639  071702  012700  072514                  MOV     #GGP5,R0        ;FSPC
15640  071706  172010                  GG6:    ADDD    (R0),AC0        ;TEST INSTRUCTION
```

```
15641  071710  170000                          CFCC                    ;NO OVERFLOW TRAP OCCURED
15642  071712                          GGER0:
15643  071712  104000                          EMT                     ;
15644  071714  012703  071710        GG7:      MOV     #GG6+2,R3
15645  071720  020316                          CMP     R3,(SP)         ;CHECK STACK DATA
15646  071722  001401                          BEQ     1$
15647  071724  104000                          EMT                     ;
15648  071726  022626                  1$:     CMP     (SP)+,(SP)+
15649  071730  170205                          STFPS   R5
15650  071732  012700  072444                  MOV     #GGDAT0,R0      ;GET THE RESULT
15651  071736  174010                          STD     AC0,(R0)
15652  071740  012701  072524                  MOV     #GGP6,R1        ;IS IT CORRECT
15653  071744  012702  000004                  MOV     #4,R2
15654  071750  022021                  GG8:    CMP     (R0)+,(R1)+
15655  071752  001401                          BEQ     GG9
15656  071754  104000                          EMT                     ;
15657  071756  077204                  GG9:    SOB     R2,GG8
15658  071760  052704  100006                  BIS     #100006,R4      ;EXACT ZERO RESULTED IF OVERFLOW
15659  071764  020405                          CMP     R4,R5           ;FPS CORRECT?, CHECK FER, FZ, FV
15660  071766  001401                          BEQ     1$
15661  071770  104000                          EMT                     ;
15662  071772  012704  000010          1$:     MOV     #10,R4
15663                                  ;CHECK FEC
15664  071776  170305                          STST    R5
15665  072000  020405                          CMP     R4,R5
15666  072002  001401                          BEQ     GG10
15667  072004  104000                          EMT                     ;
15668                                  ;CHECK UNDER FLOW CONDITION WITH
15669                                  ;TRAPS DISABLED (FIU = 0)
15670  072006  012704  000200          GG10:   MOV     #0200,R4        ;SET FIU, FIV, AND FD
15671  072012  170104                          LDFPS   R4
15672  072014  012737  071712  000244          MOV     #GGER0,@#FPVECT
15673  072022  012700  072464                  MOV     #GGP2,R0        ;SET AC0 OPERAND
15674  072026  172410                          LDD     (R0),AC0        ;FSRC
15675  072030  012700  072474                  MOV     #GGP3,R0
15676  072034  172010                  GG11:   ADDD    (R0),AC0        ;TEST INSTRUCTION
15677  072036  170205                          STFPS   R5              ;GET FPS
15678  072040  012700  072444                  MOV     #GGDAT0,R0      ;GET THE RESULT
15679  072044  174010                          STD     AC0,(R0)
15680  072046  012701  072524                  MOV     #GGP6,R1        ;IS IT CORRECT
15681  072052  012702  000004                  MOV     #4,R2
15682  072056  022021                  GG12:   CMP     (R0)+,(R1)+
15683  072060  001401                          BEQ     GG13
15684  072062  104000                          EMT                     ;
15685  072064  077204                  GG13:   SOB     R2,GG12
15686  072066  052704  000004                  BIS     #4,R4           ;FPS CORRECT?
15687  072072  020405                          CMP     R4,R5
15688  072074  001401                          BEQ     GG14
15689  072076  104000                          EMT                     ;
15690                                          ;CHECK UNDERFLOW CONDITION WITH
15691                                          ;TRAP ENABLED (FIU = 1)
15692  072100  012704  002200          GG14:   MOV     #2200,R4        ;SET FIU, FIV, AND FD
15693  072104  170104                          LDFPS   R4
15694  072106  012737  072132  000244          MOV     #GG16,@#FPVECT
15695  072114  012700  072464                  MOV     #GGP2,R0        ;SET AC0 OPERAND
15696  072120  172410                          LDD     (R0),AC0        ;FSPC
```

```
15697  072122  012700  072474          MOV     #GGP3,R0
15698  072126  172010                  GG15:   ADDD    (R0),AC0        ;TEST INSTRUCTION
15699  072130  170000                          CFCC
15700  072132  012703  072130          GG16:   MOV     #GG15+2,R3
15701  072136  021603                          CMP     (SP),R3
15702  072140  001401                          BEQ     1$
15703  072142  104000                          EMT                     ;
15704  072144  022626                  1$:     CMP     (SP)+,(SP)+
15705  072146  170205                          STFPS   R5              ;GET FPS
15706  072150  012700  072444                  MOV     #GGDAT0,R0      ;GET THE RESULT
15707  072154  174010                          STD     AC0,(R0)
15708  072156  012701  072534                  MOV     #GGP7,R1        ;IS IT CORRECT
15709  072162  012702  000004                  MOV     #4,R2
15710  072166  022021                  GG17:   CMP     (R0)+,(R1)+
15711  072170  001401                          BEQ     GG18
15712  072172  104000                          EMT                     ;
15713  072174  077204                  GG18:   SOB     R2,GG17
15714  072176  052704  100000                  BIS     #100000,R4
15715  072202  020405                          CMP     R4,R5           ;FPS CORRECT?
15716  072204  001401                          BEQ     1$
15717  072206  104000                          EMT                     ;
15718  072210  012704  000012          1$:     MOV     #12,R4
15719                                  ;CHECK FEC
15720  072214  170305                          STST    R5
15721  072216  020405                          CMP     R4,R5
15722  072220  001401                          BEQ     GG19
15723  072222  104000                          EMT                     ;
15724                                  ;CHECK UNDERFLOW CONDITION WITH TRAPS
15725                                  ;DISABLED (FIU = 0)
15726  072224  012704  000200          GG19:   MOV     #0200,R4        ;SET FIU, FIV, AND FD
15727  072230  170104                          LDFPS   R4
15728  072232  012737  072350  000244          MOV     #GGER14,@#FPVECT
15729  072240  012700  072464                  MOV     #GGP2,R0        ;SET AC0 OPERAND
15730  072244  172410                          LDD     (R0),AC0
15731  072246  012700  072544                  MOV     #GGP8,R0        ;FSPC
15732  072252  172010                  GG20:   ADDD    (R0),AC0        ;TEST INSTRUCTION
15733  072254  170205                          STFPS   R5              ;GET FPS
15734  072256  012700  072444                  MOV     #GGDAT0,R0      ;GET THE RESULT
15735  072262  174010                          STD     AC0,(R0)
15736  072264  012701  072524                  MOV     #GGP6,R1        ;IS IT CORRECT
15737  072270  012702  000004                  MOV     #4,R2
15738  072274  022021                  GG21:   CMP     (R0)+,(R1)+
15739  072276  001401                          BEQ     GG22
15740  072300  104000                          EMT                     ;
15741  072302  077204                  GG22:   SOB     R2,GG21
15742  072304  052704  000004                  BIS     #4,R4           ;FPS CORRECT?
15743  072310  020405                          CMP     R4,R5
15744  072312  001401                          BEQ     GG23
15745  072314  104000                          EMT                     ;
15746                                          ;CHECK UNDERFLOW CONDITION WITH TRAP
15747                                          ;ENABLED (FIU = 1)
15748  072316  012704  002200          GG23:   MOV     #2200,R4        ;SET FIU, FIV, AND FD
15749  072322  170104                          LDFPS   R4
15750  072324  012737  072352  000244          MOV     #GG25,@#FPVECT
15751  072332  012700  072464                  MOV     #GGP2,R0        ;SET AC0 OPERAND
15752  072336  172410                          LDD     (R0),AC0
```

```
15753  072340  012700  072544          MOV     #GGP8,R0        ;FSRC
15754  072344  172010          GG24:   ADDD    (R0),AC0        ;TEST INSTRUCTION
15755  072346  170000                  CFCC
15756  072350                  GGER14:
15757  072350  104000                  EMT                     ;
15758  072352  012703  072346  GG25:   MOV     #GG24+2,R3
15759  072356  020316                  CMP     R3,(SP)
15760  072360  001401                  BEQ     1$
15761  072362  104000                  EMT                     ;
15762  072364  022626          1$:     CMP     (SP)+,(SP)+
15763  072366  170205                  STFPS   R5              ;GET FPS
15764  072370  012700  072444          MOV     #GGDAT0,R0      ;GET THE RESULT
15765  072374  174010                  STD     AC0,(R0)
15766  072376  012701  072554          MOV     #GGP9,R1        ;IS IT CORRECT
15767  072402  012702  000004          MOV     #4,R2
15768  072406  022021          GG26:   CMP     (R0)+,(R1)+
15769  072410  001401                  BEQ     GG27
15770  072412  104000                  EMT                     ;
15771  072414  077204          GG27:   SOB     R2,GG26
15772  072416  052704  100004          BIS     #100004,R4
15773  072422  020405                  CMP     R4,R5           ;FPS CORRECT?
15774  072424  001401                  BEQ     1$
15775  072426  104000                  EMT                     ;
15776  072430  012704  000012  1$:     MOV     #12,R4
15777                                  ;CHECK FEC
15778  072434  170305                  STST    R5
15779  072436  020405                  CMP     R4,R5
15780  072440  001451                  BEQ     GGDONE
15781  072442  104000                  EMT                     ;
15782  072444  000000          GGDAT0: 0
15783  072446  000000                  0
15784  072450  000000                  0
15785  072452  000000                  0
15786
15787  072454  000300          GGP1:   300
15788  072456  000000                  0
15789  072460  000000                  0
15790  072462  000000                  0
15791  072464  100200          GGP2:   100200
15792  072466  000000                  0
15793  072470  000000                  0
15794  072472  000000                  0
15795  072474  000200          GGP3:   200
15796  072476  000000                  0
15797  072500  000000                  0
15798  072502  000001                  1
15799  072504  010200          GGP4:   10200
15800  072506  000000                  0
15801  072510  000000                  0
15802  072512  000000                  0
15803  072514  077600          GGP5:   77600                   ;OVER FLOW = GGP5 + GGP5
15804  072516  000000                  0
15805  072520  000000                  0
15806  072522  000000                  0
15807  072524  000000          GGP6:   0                       ;OVERFLOW RESULT
15808  072526  000000                  0                       ;UNDERFLOW RESULT
```

```
15809  072530  000000                  0                       ;GGP6 = GGP4 + GGP5
15810  072532  000000                  0                       ;      = GGP3 + GGP2 (FIU = 0)
15811                                                          ;      = GGP3 + GGP1
15812  072534  062400          GGP7:   62400                   ;GGP7 = GGP3 + GGP2 (FIU = 1)
15813  072536  000000                  0
15814  072540  000000                  0
15815  072542  000000                  0
15816  072544  000340          GGP8:   340
15817  072546  000000                  0
15818  072550  000000                  0
15819  072552  000000                  0
15820  072554  000100          GGP9:   100
15821  072556  000000                  0
15822  072560  000000                  0
15823  072562  000000                  0
15824  072564                  GGDONE:
15825  072564  004767  032002          JSR     PC,..RSET       ;GO INITIALIZE THE FP. AND ACK; AND
15826                                                          ;SEE IF THE USER HAS EXPRESSED
15827                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
15828                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
15829                                                          ;THE USER TYPED CONTROL G?).
15830
15831
15832                                  ;*******************************************************************************
15833                                  ;TEST 472       LDCFD AND LDCDF TEST
15834                                  ;*******************************************************************************
15835  072570                  TS472:
15836                          ;TEST FOR CORRECT AUTO INCREMENT CONSTANT.
15837  072570  012704  000200          MOV     #200,R4         ;SET LONG INTEGER MODE
15838  072574  170104                  LDFPS   R4
15839  072576  012700  073326          MOV     #HXP1,R0
15840  072602  172410                  LDD     (R0),AC0
15841  072604  012700  073336          MOV     #HXP2,R0
15842  072610  177420          HX2:    LDCFD   (R0)+,AC0
15843  072612  020027  073342          CMP     R0,#HXP2+4      ;IS R0 CORRECT
15844  072616  001401                  BEQ     HX3
15845  072620  104000                  EMT                     ;
15846  072622                  HX3:
15847  072622  170205                  STFPS   R5              ;GET FPS
15848  072624  012700  073316          MOV     #HXDAT0,R0
15849  072630  174010                  STD     AC0,(R0)        ;GET AC0
15850  072632  012701  073406          MOV     #HXP7,R1        ;SEE IF RESULT IS
15851  072636  012702  000004          MOV     #4,R2           ;CORRECT
15852  072642  022120          HX4:    CMP     (R1)+,(R0)+
15853  072644  001401                  BEQ     HX7
15854  072646  104000                  EMT                     ;
15855  072650  077204          HX7:    SOB     R2,HX4
15856  072652  012704  000200          MOV     #200,R4         ;FPS CORRECT?
15857  072656  020405                  CMP     R4,R5
15858  072660  001401                  BEQ     HX8
15859  072662  104000                  EMT                     ;
15860                          ;NOW    TEST    LDCDF
15861  072664  012704  000200  HX8:    MOV #200,R4
15862  072670  170104                  LDFPS R4
15863
15864  072672  012700  073326          MOV     #HXP1,R0
```

```
15865  072676  172410                          LDD     (R0),AC0
15866
15867  072700  012700  073336                  MOV     #HXP2,R0
15868  072704  170001                          SETF
15869  072706  177420                  HX9:    LDCDF   (R0)+,AC0       ;TEST INSTRUCTION
15870  072710  020027  073346                  CMP     R0,#HXP2+10     ;WAS A GUOD
15871  072714  001401                          BEQ     HX10
15872  072716  104000                          EMT                     ;
15873
15874  072720                          HX10:
15875  072720  170205                          STFPS   R5
15876  072722  012700  073316                  MOV     #HXDATO,R0
15877  072726  170011                          SETD
15878  072730  174010                          STD     AC0,(R0)        ;GET RESULT
15879  072732  012701  073416                  MOV     #HXP8,R1
15880  072736  012702  000004                  MOV     #4,R2
15881  072742  022120                  HX11:   CMP     (R1)+,(R0)+     ;IS IT CORRECT?
15882  072744  001401                          BEQ     HX14
15883  072746  104000                          EMT                     ;
15884  072750  077204                  HX14:   SOB     R2,HX11
15885
15886  072752  012704  000000                  MOV     #0,R4           ;FPS CORRECT?
15887  072756  020405                          CMP     R4,R5
15888  072760  001401                          BEQ     HX15
15889  072762  104000                          EMT                     ;
15890                                  ;TEST GR7 IMMEDIATE MODE CONSTANT
15891  072764  012704  000200          HX15:   MOV     #200,R4
15892  072770  170104                          LDFPS   R4              ;SET FD
15893  072772  012737  073022  000004          MOV     #HXER9,@#ERRVECT
15894  073000  005001                          CLR     R1
15895  073002  177427  043243          HX16:   LDCFD   #5201,AC0
15896  073006  005201                  HX165:  INC     R1
15897  073010  005201                          INC     R1
15898  073012  005201                          INC     R1
15899  073014  020127  000003                  CMP     R1,#3           ;SEE IF PC WAS
15900  073020  001401                          BEQ     HX17
15901  073022                          HXER9:
15902  073022  104000                          EMT                     ;
15903  073024  012704  000200          HX17:   MOV     #200,R4
15904  073030  170104                          LDFPS   R4
15905  073032  012700  073376                  MOV     #HXP6,R0
15906  073036  172410                          LDD     (R0),AC0
15907  073040  012700  073336                  MOV     #HXP2,R0
15908  073044  177410                  HX18:   LDCFD   (R0),AC0
15909
15910  073046  012700  073316                  MOV     #HXDATO,R0
15911  073052  174010                          STD     AC0,(R0)        ;GET RESULT.
15912  073054  012701  073406                  MOV     #HXP7,R1
15913  073060  012702  000004                  MOV     #4,R2
15914  073064  022021                  HX19:   CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
15915  073066  001401                          BEQ     HX20
15916  073070  104000                          EMT                     ;
15917  073072  077204                  HX20:   SOB     R2,HX19
15918
15919                                  ;TEST LDCFD WITH NEGATIVE OPERAND
15920  073074  012704  000200                  MOV     #200,R4
```

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15921  073100  170104                  LDFPS   R4
15922  073102  012700  073376          MOV     #HXP6,R0
15923  073106  172410                  LDD     (R0),AC0
15924  073110  012700  073356          MOV     #HXP4,R0
15925  073114  177410          HX22:   LDCFD   (R0),AC0
15926
15927  073116  012700  073316          MOV     #HXDAT0,R0
15928  073122  174010                  STD     AC0,(R0)        ;GET RESULT
15929
15930  073124  012701  073366          MOV     #HXP5,R1
15931  073130  012702  000004          MOV     #4,R2
15932  073134  022120          HX23:   CMP     (R1)+,(R0)+
15933  073136  001401                  BEQ     HX26
15934  073140  104000                  EMT                     ;
15935  073142  077204          HX26:   SOB     R2,HX23
15936
15937                          ;TEST   LDCFD   0
15938
15939  073144  012704  000200          MOV     #200,R4
15940  073150  170104                  LDFPS   R4
15941
15942  073152  012700  073326          MOV     #HXP1,R0
15943  073156  172410                  LDD     (R0),AC0
15944  073160  172010                  ADDD    (R0),AC0
15945
15946  073162  012700  073326          MOV     #HXP1,R0
15947  073166  177410          HX28:   LDCFD   (R0),AC0
15948
15949  073170  170205                  STFPS   R5
15950
15951  073172  012700  073316          MOV     #HXDAT0,R0
15952  073176  174010                  STD     AC0,(R0)        ;GET RESULT
15953
15954  073200  012701  073326          MOV     #HXP1,R1
15955  073204  012702  000004          MOV     #4,R2
15956  073210  022120          HX29:   CMP     (R1)+,(R0)+     ;IS IT 0?
15957  073212  001401                  BEQ     HX30
15958  073214  104000                  EMT                     ;
15959  073216  077204          HX30:   SOB     R2,HX29
15960
15961  073220  012704  000204          MOV     #204,R4         ;FPS CORRECT
15962  073224  020405                  CMP     R4,R5
15963  073226  001401                  BEQ     HX31
15964  073230  104000                  EMT                     ;
15965                          ;TEST   LDCFD   0
15966  073232  012704  000200  HX31:   MOV     #200,R4
15967  073236  170104                  LDFPS   R4
15968  073240  012700  073376          MOV     #HXP6,R0
15969  073244  172410                  LDD     (R0),AC0
15970  073246  012700  073326          MOV     #HXP1,R0
15971  073252  177410          HX32:   LDCFD   (R0),AC0
15972  073254  170205                  STFPS   R5
15973  073256  012700  073316          MOV     #HXDAT0,R0
15974  073262  174010                  STD     AC0,(R0)        ;GET RESULT
15975  073264  012701  073326          MOV     #HXP1,R1
15976  073270  012702  000004          MOV     #4,R2
```

```
15977  073274  022120                HX33:   CMP     (R1)+,(R0)+     ;IS IT ZERO?
15978  073276  001401                        BEQ     HX34
15979  073300  104000                        EMT                     ;
15980  073302  077204                HX34:   SOB     R2,HX33
15981
15982  073304  012704  000204                MOV     #204,R4         ;FPS CORRECT?
15983  073310  020405                        CMP     R4,R5
15984  073312  001445                        BEQ     HXDONE
15985  073314  104000                        EMT                     ;
15986
15987  073316  000000                HXDATO: 0
15988  073320  000000                        0
15989  073322  000000                        0
15990  073324  000000                        0
15991
15992  073326  000000                HXP1:   0
15993  073330  000000                        0
15994  073332  000000                        0
15995  073334  000000                        0
15996
15997  073336  000577                HXP2:   577
15998  073340  177776                        177776
15999  073342  177777                        177777
16000  073344  177776                        177776
16001  073346  005201                HXP3:   5201
16002  073350  000000                        0
16003  073352  000000                        0
16004  073354  000000                        0
16005  073356  100577                HXP4:   100577
16006  073360  177776                        177776
16007  073362  177777                        177777
16008  073364  177776                        177776
16009  073366  100577                HXP5:   100577
16010  073370  177776                        177776
16011  073372  000000                        0
16012  073374  000000                        0
16013  073376  000252                HXP6:   252
16014  073400  125252                        125252
16015  073402  125252                        125252
16016  073404  125252                        125252
16017
16018  073406  000577                HXP7:   577
16019  073410  177776                        177776
16020  073412  000000                        0
16021  073414  000000                        0
16022  073416  000577                HXP8:   577
16023  073420  177777                        177777
16024  073422  000000                        0
16025  073424  000000                        0
16026
16027  073426                        HXDONE:
16028  073426  004767  031140                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
16029                                                                ;SEE IF THE USER HAS EXPRESSED
16030                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
16031                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
16032                                                                ;THE USER TYPED CONTROL G?).
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```
16033
16034
16035
16036
16037                                   ;*****************************************************************************
16038                                   ;TEST 473       CMPD TEST
16039                                   ;*****************************************************************************
16040  073432                           TS473:
16041
16042                                   ;TEST THE CMPD INSTRUCTION WITH (FSRC=AC=0)
16043  073432  004737  074126           AAA1:   JSR     PC,@#CMPSUB
16044  073436  000000  000000  000000   1$:     .WORD   0,0,0,0                 ;AC0
16045  073444  000000
16046  073446  000000  000000  000000   2$:     .WORD   0,0,0,0                 ;FSRC
16047  073454  000000
16048  073456  000200                   3$:     200                             ;FPS BEFORE EXECUTION
16049  073460  000204                           204                             ;FPS AFTER EXECUTION
16050
16051
16052                                   ;TEST CMPD WITH (AC=0) AND FSRC POSITIVE.
16053  073462  004737  074126           AAA2:   JSR     PC,@#CMPSUB
16054  073466  000000  000000  000000   1$:     .WORD   0,0,0,0                 ;AC
16055  073474  000000
16056  073476  025252                   2$:     25252                           ;FSRC
16057  073500  052525                           52525
16058  073502  125252                           125252
16059  073504  052525                           52525
16060  073506  000200                   3$:     200                             ;FPS BEFORE EXECUTION
16061  073510  000200                           200                             ;FPS AFTER EXECUTION
16062
16063                                   ;TEST CMPD WITH (AC=0) AND FSRC NEGATIVE
16064  073512  004737  074126           AAA3:   JSR     PC,@#CMPSUB
16065  073516  000000  000000  000000   1$:     .WORD   0,0,0,0                 ;AC
16066  073524  000000
16067  073526  125252                   2$:     125252                          ;FSRC
16068  073530  125252                           125252
16069  073532  052525                           52525
16070  073534  125252                           125252
16071  073536  000200                   3$:     200                             ;FPS BEFORE EXECUTION
16072  073540  000210                           210                             ;FPS AFTER EXECUTION
16073
16074                                   ;TEST CMPD WITH (FSRC=0) AND AC POSITIVE
16075  073542  004737  074126           AAA4:   JSR     PC,@#CMPSUB
16076  073546  025252                   1$:     25252                           ;AC
16077  073550  052525                           52525
16078  073552  125252                           125252
16079  073554  052525                           52525
16080  073556  000000  000000  000000   2$:     .WORD   0,0,0,0                 ;FSRC
16081  073564  000000
16082  073566  000200                   3$:     200                             ;FPS BEFORE EXECUTION
16083  073570  000210                           210                             ;FPS AFTER EXECUTION
16084
16085
16086                                   ;TEST CMPD WITH (FSRC=0) AND AC NEGATIVE
16087  073572  004737  074126           AAA5:   JSR     PC,@#CMPSUB
16088  073576  125252                   1$:     125252                          ;AC
```

```
16089  073600  125252                       125252
16090  073602  052525                       52525
16091  073604  125252                       125252
16092  073606  000000  000000  000000 2$:   .WORD  0,0,0,0                ;FSRC
16093  073614  000000
16094  073616  000200                 3$:   200                          ;FPS BEFORE EXECUTION
16095  073620  000200                       200                          ;FPS AFTER EXECUTION
16096
16097                                 ;TEST CMPD WITH AC POSITIVE AND FSRC NEGATIVE
16098  073622  004737  074126         AAA6: JSR    PC,@#CMPSUB
16099  073626  052525                 1$:   52525                        ;AC
16100  073630  125252                       125252
16101  073632  052525                       52525
16102  073634  125252                       125252
16103  073636  125252                 2$:   125252                       ;;FSRC
16104  073640  052525                       52525
16105  073642  125252                       125252
16106  073644  052525                       52525
16107  073646  000200                 3$:   200                          ;FPS BEFORE EXECUTION
16108  073650  000210                       210                          ;FPS AFTER EXECUTION
16109
16110
16111                                 ;TEST CMPD WITH AC NEGATIVE AND FSRC POSITIVE
16112  073652  004737  074126         AAA7: JSR    PC,@#CMPSUB
16113  073656  125252                 1$:   125252                       ;AC
16114  073660  052525                       52525
16115  073662  125252                       125252
16116  073664  052525                       52525
16117  073666  052525                 2$:   52525                        ;FSRC
16118  073670  125252                       125252
16119  073672  052525                       52525
16120  073674  125252                       125252
16121  073676  000200                 3$:   200                          ;FPS BEFORE EXECUTION
16122  073700  000200                       200                          ;FPS AFTER EXECUTION
16123
16124                                 ;TEST CMPD WITH AC POSITIVE AND FSRC POSITIVE
16125                                 ;AND EAC LESS THAN EFSRC.
16126  073702  004737  074126         AAA8: JSR    PC,@#CMPSUB
16127  073706  012345                 1$:   12345                        ;AC
16128  073710  067654                       67654
16129  073712  032101                       32101
16130  073714  023456                       23456
16131  073716  023456                 2$:   23456                        ;FSRC
16132  073720  076543                       76543
16133  073722  021012                       21012
16134  073724  034567                       34567
16135  073726  000200                 3$:   200                          ;FPS BEFORE EXECUTION
16136  073730  000200                       200                          ;FPS AFTER EXECUTION
16137
16138
16139                                 ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE AND EAC GREATER THAN EFSRC
16140  073732  004737  074126         AAA9: JSR    PC,@#CMPSUB
16141  073736  045676                 1$:   45676                        ;AC
16142  073740  054321                       54321
16143  073742  012345                       12345
16144  073744  067654                       67654
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```
16145  073746  034567                  2$:     34567                           ;FSRC
16146  073750  065432                          65432
16147  073752  101234                          101234
16148  073754  056765                          56765
16149  073756  000200                  3$:     200                             ;FPS BEFORE EXECUTION
16150  073760  000210                          210                             ;FPS AFTER EXECUTION
16151
16152                                  ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE AND AC EQUAL TO FSRC
16153  073762  004737  074126          AAA10:  JSR     PC,@#CMPSUB
16154  073766  012345                  1$:     12345                           ;AC
16155  073770  067012                          67012
16156  073772  034567                          34567
16157  073774  012345                          012345
16158  073776  012345                  2$:     12345                           ;FSRC
16159  074000  067012                          67012
16160  074002  034567                          34567
16161  074004  012345                          012345
16162  074006  000200                  3$:     200                             ;FPS BEFORE EXECUTION
16163  074010  000204                          204                             ;FPS AFTER EXECUTION
16164
16165                                  ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE, EAC EQUAL TO EFSRC,
16166                                  ;AND FSRC GREATER THAN AC.
16167  074012  004737  074126          AAA11:  JSR     PC,@#CMPSUB
16168  074016  012345                  1$:     12345                           ;AC
16169  074020  067012                          67012
16170  074022  034567                          34567
16171  074024  012345                          012345
16172  074026  012345                  2$:     12345                           ;FSRC
16173  074030  070123                          70123
16174  074032  045670                          45670
16175  074034  123456                          123456
16176  074036  000200                  3$:     200                             ;FPS BEFORE EXECUTION
16177  074040  000200                          200                             ;FPS AFTER EXECUTION
16178
16179                                  ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE, EAC EQUAL TO EFSRC,
16180                                  ;AND AC GREATER THAN FSRC.
16181  074042  004737  074126          AAA12:  JSR     PC,@#CMPSUB
16182  074046  054321                  1$:     54321                           ;AC
16183  074050  076543                          76543
16184  074052  021076                          21076
16185  074054  054321                          54321
16186  074056  054321                  2$:     54321                           ;FSRC
16187  074060  065432                          65432
16188  074062  107654                          107654
16189  074064  032107                          32107
16190  074066  000200                  3$:     200                             ;FPS BEFORE EXECUTION
16191  074070  000210                          210                             ;FPS AFTER EXECUTION
16192
16193                                  ;TEST CMPD WITH AC NEGATIVE, FSRC NEGATIVE, EAC EQUAL TO EFSRC,
16194                                  ;AND AC GREATER THAN FSRC
16195  074072  004737  074126          AAA13:  JSR     PC,@#CMPSUB
16196  074076  112345                  1$:     112345                          ;AC
16197  074100  043210                          43210
16198  074102  076543                          76543
16199  074104  021076                          21076
16200  074106  112345                  2$:     112345                          ;FSRC
```

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                                T473    CMPD TEST

 16201  074110  054321                          54321
 16202  074112  007654                          07654
 16203  074114  032107                          32107
 16204  074116  000200                  3$:     200                     ;FPS BEFORE EXECUTION
 16205  074120  000210                          210                     ;FPS AFTER EXECUTION
 16206
 16207
 16208  074122  000137  074232                  JMP     @#AAADONE       ;FINISHED CMPD TEST.
 16209
 16210
 16211                                  ;THIS SUBROUTINE, CMPSUB, IS CALLED TO SET UP, EXECUTE
 16212                                  ;AND CHECK THE RESULTS OF A CMPD INSTRUCTION.
 16213                                  ;IT IS CALLED THUS:
 16214                                  ;
 16215                                  ;               JSR     PC,@#CMPSUB
 16216                                  ;       ACARG:  .WORD   X,X,X,X                 ;AC OPERAND
 16217                                  ;       FSRCARG:.WORD   X,X,X,X                 ;FSRC OPERAND
 16218                                  ;       FPSB:   .WORD   X                       ;FPS BEFORE EXECUTION
 16219                                  ;       FPSA:   .WORD   X                       ;FPS AFTER EXECUTION
 16220                                  ;       FPSE:   .WORD   X                       ;ERROR FPS
 16221                                  ;       ERR:    ERROR   X                       ;FPS ERROR
 16222                                  ;       CONT:                                   ;RETURN ADDRESS
 16223                                  ;
 16224                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
 16225                                  ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, CMPD, IS EXECUTED.
 16226                                  ;AFTER THE EXECUTION THE FPS IS CHECKED AGAINST FPSA. IF IT IS A MATCH
 16227                                  ;THEN THERE WAS NO ERROR AND CONTROL IS RETURNED TO CONT. IF
 16228                                  ;THE FPS IS INCORRECT IT IS COMPARED WITH FPSE IN AN ATTEMPT TO ANALYSE
 16229                                  ;THE FAILURE. IF THE FPS IS THE SAME AS FPSE THEN CONTROL IS
 16230                                  ;RETURNED TO THE ERROR CALL AT LOCATION ERR. IF THE FPS WAS
 16231                                  ;NOT CORRECT BUT DIDN'T MATCH FPSE A GENERAL ERROR IS REPORTED
 16232                                  ;AND CONTROL IS PASSED TO CONT.
 16233
 16234  074126  012601          CMPSUB: MOV     (SP)+,R1                ;PICK UP A POINTER TO THE
 16235                                                                  ;ARGUMENTS.
 16236  074130  016100  000020          MOV     20(R1),R0               ;GET THE FPS BEFORE EXECUTION.
 16237  074134  170100                  LDFPS   R0                      ;LOAD IT INTO THE FPS.
 16238
 16239  074136  010100                  MOV     R1,R0                   ;GET ADDRESS OF AC OPERAND.
 16240  074140  172410                  LDD     (R0),AC0                ;LOAD AC0 OPERAND
 16241
 16242  074142  010100                  MOV     R1,R0                   ;COMPUTE FSRC OPERAND
 16243  074144  062700  000010          ADD     #10,R0                  ;ADDRESS
 16244
 16245  074150  000240                  NOP                             ;FOR SCOPING.
 16246  074152  173410          1$:     CMPD    (R0),AC0                ;EXECUTE THE TEST INSTRUCTION.
 16247
 16248  074154  170205                  STFPS   R5                      ;SAVE FPS AFTER INSTRUCTION.
 16249
 16250  074156  016104  000022          MOV     22(R1),R4               ;GET EXPECTED FPS.
 16251  074162  020405                  CMP     R4,R5                   ;WAS FPS CORRECT?
 16252  074164  020405                  CMP     R4,R5                   ;WAS FPS CORRECT?
 16253  074166  001401                  BEQ     3$
 16254  074170  104000                  EMT                             ;
 16255  074172  012700  074222  3$:     MOV     #CMPTMP,R0              ;IF FPS WAS CORRECT MAKE SURE
 16256  074176  174010                  STD     AC0,(R0)                ;AC0 WAS NOT AFFECTED BY CMPD.
```

```
16257  074200  010102                        MOV     R1,R2
16258  074202  012703  000004                MOV     #4,R3
16259  074206  022220                4$:     CMP     (R2)+,(R0)+
16260  074210  001401                        BEQ     5$
16261  074212  104000                        EMT                             ;
16262  074214  077304                5$:     SOB     R3,4$
16263
16264  074216  000161  000024                JMP     24(R1)                  ;RETURN
16265
16266  074222  000000  000000  000000 CMPTMP: .WORD   0,0,0,0
16267  074230  000000
16268
16269
16270
16271  074232                        AAADONE:
16272  074232  004767  030334                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
16273                                                                ;SEE IF THE USER HAS EXPRESSED
16274                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
16275                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
16276                                                                ;THE USER TYPED CONTROL G?).
16277
16278
16279
16280
16281                                ;*****************************************************************************
16282                                ;TEST 474       DIVD WITH (FSRC=0) AND (BUT FD) TEST
16283                                ;*****************************************************************************
16284  074236                        TS474:
16285
16286  074236  012704  040200        BBB0:   MOV     #40200,R4       ;SET UP FPS
16287                                                                ;WITH INTERRUPTS
16288                                                                ;DISABLED.
16289  074242  170104                        LDFPS   R4
16290  074244  012737  074302  000244        MOV     #BBBER1,@#FPVECT;SET UP FOR ANY FP INTERRUPTS.
16291  074252  012700  074466                MOV     #BBBP1,R0       ;SET UP AC0 = 0
16292  074256  172410                        LDD     (R0),AC0
16293  074260  012701  074466                MOV     #BBBP1,R1       ;FSRC = 0
16294
16295  074264  174411                BBB1:   DIVD    (R1),AC0        ;TEST INSTRUCTION
16296
16297  074266  170205                        STFPS   R5              ;GET FPS
16298  074270  170303                        STST    R3              ;GET FEC
16299
16300  074272  012704  140204                MOV     #140204,R4      ;EXPECTED FPS.
16301  074276  020405                        CMP     R4,R5           ;IS FPS CORRECT.
16302  074300  001401                        BEQ     BBB7
16303  074302                        BBBER1:
16304  074302  104000                        EMT                             ;
16305  074304  012702  000004        BBB7:   MOV     #4,R2           ;EXPECTED FEC.
16306  074310  020203                        CMP     R2,R3           ;IS FEC CORRECT?
16307  074312  001401                        BEQ     BBB2
16308  074314  104000                        EMT                             ;
16309
16310                                ;TEST DIVD WITH (FSRC=0) AND TRAPS DISABLED.
16311  074316  012704  040200        BBB2:   MOV     #40200,R4       ;LOAD FPS WITH TRAPS DISABLED.
16312  074322  170104                        LDFPS   R4
```

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16313
16314  074324  012700  074476                  MOV     #BBBP2,R0       ;SET UP AC0 OPERAND (NON ZERO).
16315  074330  172410                          LDD     (R0),AC0
16316  074332  012700  074466                  MOV     #BBBP1,R0       ;FSRC=0
16317  074336  174410                  BBB3:   DIVD    (R0),AC0
16318
16319  074340  170205                          STFPS   R5              ;GET FPS.
16320  074342  170303                          STST    R3              ;GET FEC.
16321
16322  074344  012704  140200                  MOV     #140200,R4              ;EXPECTED FPS.
16323  074350  020405                          CMP     R4,R5           ;IS FPS CORRECT?
16324  074352  001401                          BEQ     1$
16325  074354  104000                          EMT                     ;
16326  074356  012702  000004          1$:     MOV     #4,R2           ;EXPECTED FEC.
16327  074362  020203                          CMP     R2,R3           ;WAS FEC CORRECT?
16328  074364  001401                          BEQ     BBB4
16329  074366  104000                          EMT                     ;
16330
16331                                  ;TEST DIVD WITH FSRC=0) AND TRAPS ENABLED.
16332  074370  012704  000200          BBB4:   MOV     #200,R4         ;SET UP FPS. TRAP ENABLED.
16333  074374  170104                          LDFPS   R4
16334
16335  074376  012700  074476                  MOV     #BBBP2,R0       ;SET UP AC0 OPERAND (NON ZERO).
16336  074402  172410                          LDD     (R0),AC0
16337
16338  074404  012737  074424  000244          MOV     #BBB6,@#FPVECT  ;SET UP FOR THE EXPECTED INTERRUPT.
16339  074412  012700  074466                  MOV     #BBBP1,R0       ;FSRC=0
16340
16341  074416  174410                  BBB5:   DIVD    (R0),AC0        ;TEST INSTRUCTION (SHOULD RESULT IN TRAP).
16342  074420  170000                          CFCC
16343  074422  104000                          EMT                     ;
16344  074424  022716  074420          BBB6:   CMP     #BBB5+2,(SP)    ;TRAP TO HERE WHEN THE DIVISION BY 0
16345                                                                  ;OCCURS. FIRST SEE IF THE ADDRESS OF
16346                                                                  ;THE TRAP IS 2+THE ADDRESS OF THE TEST
16347                                                                  ;DIVD INSTRUCTION.
16348  074430  001401                          BEQ     1$
16349  074432  104000                          EMT                     ;
16350  074434  170205                  1$:     STFPS   R5              ;GET FPS.
16351  074436  170303                          STST    R3              ;GET FEC.
16352  074440  022626                          CMP     (SP)+,(SP)+     ;RESET THE STACK.
16353
16354  074442  012704  100200                  MOV     #100200,R4      ;EXPECTED FPS.
16355  074446  020405                          CMP     R4,R5           ;IS FPS CORRECT?
16356  074450  001401                          BEQ     2$
16357  074452  104000                          EMT                     ;
16358  074454  012702  000004          2$:     MOV     #4,R2           ;EXPECTED FEC.
16359  074460  020203                          CMP     R2,R3           ;IS FEC CORRECT?
16360  074462  001411                          BEQ     BBBDONE
16361  074464  104000                          EMT                     ;
16362
16363  074466  000000  000000  000000  BBBP1:  .WORD   0,0,0,0
16364  074474  000000
16365  074476  012345  054321  023456  BBBP2:  .WORD   12345,54321,23456,76543
16366  074504  076543
16367
16368
```

```
16369
16370  074506
16371  074506  004767  030060        BBBDONE:
                                     JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
                                                             ;SEE IF THE USER HAS EXPRESSED
                                                             ;THE DESIRE TO CHANGE THE SOFTWARE
                                                             ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                             ;THE USER TYPED CONTROL G?).
16372
16373
16374
16375
16376
16377
16378
16379                                ;*****************************************************************************
16380                                ;TEST 475       DIVF TEST
16381                                ;*****************************************************************************
16382  074512                        TS475:
16383
16384                                ;CHECK DIVF WITH (AC=0).
16385  074512  004767  000404        CCC1:   JSR     PC,DIVFSUB
16386  074516  000000  000000        1$:     .WORD   0,0             ;AC
16387  074522  012345  067012        2$:     .WORD   12345,67012     ;FSRC
16388  074526  000000  000000        3$:     .WORD   0,0             ;RES
16389  074532  000000                4$:     0                       ;FPS BEFORE EXECUTION
16390  074534  000004                        4                       ;FPS AFTER EXECUTION
16391
16392                                ;TEST DIVF WITH AC POSITIVE, FSRC POSITIVE AND IN ROUND MODE.
16393  074536  004737  075122        CCC2:   JSR     PC,@#DIVFSUB
16394  074542  065652  125252        1$:     .WORD   65652,125252    ;AC
16395  074546  065600  000000        2$:     .WORD   65600,0         ;FSRC
16396  074552  040252  125252        3$:     .WORD   40252,125252    ;RES
16397  074556  003000                4$:     3000                    ;FPS BEFORE EXECUTION.
16398  074560  003000                        3000                    ;FPS AFTER EXECUTION.
16399
16400                                ;TEST DIVF WITH AC POSITIVE, FSRC POSITIVE.
16401  074562  004767  000334        CCC3:   JSR     PC,DIVFSUB
16402  074566  076400  000000        1$:     .WORD   76400,0         ;AC
16403  074572  076400  000000        2$:     .WORD   76400,0         ;FSRC
16404  074576  040200  000000        3$:     .WORD   40200,0         ;RES
16405  074602  001000                4$:     1000                    ;FPS BEFORE EXECUTION.
16406  074604  001000                        1000                    ;FPS AFTER EXECUTION.
16407                                ;TEST DIVF WITH BOTH OPERANDS POSITIVE.
16408  074606  004737  075122        CCC4:   JSR     PC,@#DIVFSUB
16409  074612  056777  177777        1$:     .WORD   56777,177777    ;AC
16410  074616  054200  000000        2$:     .WORD   54200,0         ;FSRC
16411  074622  042777  177777        3$:     .WORD   42777,177777    ;RES
16412  074626  000000                4$:     0                       ;FPS BEFORE EXECUTION.
16413  074630  000000                        0                       ;FPS AFTER EXECUTION.
16414
16415                                ;TEST THE DIVF INSTRUCTION:
16416  074632  004737  075122        CCC5:   JSR     PC,@#DIVFSUB
16417  074636  012377  177777        1$:     .WORD   12377,177777    ;AC
16418  074642  012300  000000        2$:     .WORD   12300,0         ;FSRC
16419  074646  040252  125252        3$:     .WORD   40252,125252    ;RES
16420  074652  000000                4$:     0                       ;FPS BEFORE EXECUTION.
16421  074654  000000                        0                       ;FPS AFTER EXECUTION.
16422
16423                                ;TEST DIVIDE ALGORITHM. TEST ROUND CONSTANT.
16424  074656  004737  075122        CCC6:   JSR     PC,@#DIVFSUB
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```
 16425  074662  064600  000001          1$:     .WORD   64600,1         ;AC
```

```
16426  074666  066600  000000          2$:     .WORD   66600,0          ;FSRC
16427  074672  036200  000001          3$:     .WORD   36200,1          ;RES
16428  074676  000000                  4$:     0                        ;FPS BEFORE EXECUTION.
16429  074700  000000                          0                        ;FPS AFTER EXECUTION.
16430
16431                                  ;TEST DIVF.
16432  074702  004737  075122          CCC7:   JSR     PC,@#DIVFSUB
16433  074706  034577  177776          1$:     .WORD   34577,177776     ;AC
16434  074712  023400  000000          2$:     .WORD   23400,0          ;FSRC
16435  074716  051377  177776          3$:     .WORD   51377,177776     ;RES
16436  074722  000017                  4$:     17                       ;FPS BEFORE EXECUTION.
16437  074724  000000                          0                        ;FPS AFTER EXECUTION.
16438
16439
16440                                  ;DIVF TEST.
16441  074726  004737  075122          CCC8:   JSR     PC,@#DIVFSUB
16442  074732  067652  125252          1$:     .WORD   67652,125252     ;AC
16443  074736  056500  000000          2$:     .WORD   56500,0          ;FSRC
16444  074742  051343  107070          3$:     .WORD   51343,107070     ;RES
16445  074746  000000                  4$:     0                        ;FPS BEFORE EXECUTION.
16446  074750  000000                          0                        ;FPS AFTER EXECUTION.
16447
16448                                  ;DIVF WITH AC NEGATIVE, FSRC NEGATIVE.
16449  074752  004737  075122          CCC9:   JSR     PC,@#DIVFSUB
16450  074756  140400  000000          1$:     .WORD   140400,0         ;AC
16451  074762  140500  000000          2$:     .WORD   140500,0         ;FSRC
16452  074766  040052  125253          3$:     .WORD   040052,125253    ;RES
16453  074772  000000                  4$:     0                        ;FPS BEFORE EXECUTION.
16454  074774  000000                          0                        ;FPS AFTER EXECUTION.
16455
16456                                  ;DIVF WITH AC NEGATIVE AND FSRC POSITIVE.
16457  074776  004737  075122          CCC10:  JSR     PC,@#DIVFSUB
16458  075002  160077  000000          1$:     .WORD   160077,0         ;AC
16459  075006  040277  000000          2$:     .WORD   40277,0          ;FSRC
16460  075012  160000  000000          3$:     .WORD   160000,0         ;RES
16461  075016  000007                  4$:     7                        ;FPS BEFORE EXECUTION.
16462  075020  000010                          10                       ;FPS AFTER EXECUTION.
16463
16464                                  ;DIVF WITH AC POSITIVE AND FSRC NEGATIVE.
16465  075022  004737  075122          CCC11:  JSR     PC,@#DIVFSUB
16466  075026  040400  000000          1$:     .WORD   40400,0          ;AC
16467  075032  140500  000000          2$:     .WORD   140500,0         ;FSRC
16468  075036  140052  125253          3$:     .WORD   140052,125253    ;RES
16469  075042  000017                  4$:     17                       ;FPS BEFORE EXECUTION.
16470  075044  000010                          10                       ;FPS AFTER EXECUTION.
16471
16472
16473                                  ;TEST DIVF BOTH OPERANDS POSITIVE AND TRUNCATE MODE.
16474  075046  004737  075122          CCC12:  JSR     PC,@#DIVFSUB
16475  075052  060100  000001          1$:     .WORD   60100,1          ;AC
16476  075056  040300  000000          2$:     .WORD   40300,0          ;FSRC
16477  075062  060000  000000          3$:     .WORD   60000,0          ;RES
16478  075066  000052                  4$:     52                       ;FPS BEFORE EXECUTION.
16479  075070  000040                          40                       ;FPS AFTER EXECUTION.
16480
16481                                  ;DIVF WITH POSITIVE OPERANDS AND ROUND MODE.
```

```
 16482  075072  004767  000024          CCC13:  JSR     PC,DIVFSUB
 16483  075076  060100  000001          1$:     .WORD   60100,1         ;AC
 16484  075102  040300  000000          2$:     .WORD   40300,0         ;FSRC
 16485  075106  060000  000001          3$:     .WORD   60000,1         ;RES
 16486  075112  000005                  4$:     5                       ;FPS BEFORE EXECUTION.
 16487  075114  000000                          0                       ;FPS AFTER EXECUTION.
 16488
 16489  075116  000137  075240                  JMP     @#CCCDONE       ;GO TO NEXT TEST.
 16490
 16491                                  ;THIS SUBROUTINE, DIVFSUB, IS CALLED TO SET UP, EXECUTE
 16492                                  ;AND CHECK THE RESULT OF A DIVF INSTRUCTION. IT IS CALLED THUS:
 16493                                  ;
 16494                                  ;               JSR     PC,@#DIVFSUB
 16495                                  ;       ACARG:  .WORD   X,X             ;AC OPERAND
 16496                                  ;       FSRCARG:.WORD   X,X             ;FSRC OPERAND
 16497                                  ;       RES:    .WORD   X,X             ;EXPECTED RESULT
 16498                                  ;       FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
 16499                                  ;       FPSA:   .WORD   X               ;FPS AFTER EXECUTION
 16500                                  ;       ERRES:  .WORD   X,X             ;ERROR RESULT
 16501                                  ;       ERR:    ERROR   X               ;RESULT ERROR
 16502                                  ;       CONT:                           ;RETURN ADDRESS
 16503                                  ;
 16504                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
 16505                                  ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, DIVF IS EXECUTED.
 16506                                  ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
 16507                                  ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
 16508                                  ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
 16509                                  ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
 16510                                  ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
 16511                                  ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
 16512                                  ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
 16513                                  ;THEN THE FAILURE IS REPORTED IN DIVFSUB AND CONTROL IS PASSED TO
 16514                                  ;CONT. IF NO ERRORS ARE DETECTED THEN DIVFSUB RETURNS CONTROL
 16515                                  ;TO CONT.
 16516
 16517  075122  012601                  DIVFSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
 16518  075124  012700  000200                  MOV     #200,R0         ;SET FD MODE.
 16519  075130  170100                          LDFPS   R0
 16520  075132  010100                          MOV     R1,R0           ;LOAD THE AC OPERAND.
 16521  075134  172410                          LDD     (R0),AC0
 16522  075136  016100  000014                  MOV     14(R1),R0       ;LOAD THE FPS
 16523  075142  170100                          LDFPS   R0
 16524  075144  010100                          MOV     R1,R0
 16525  075146  062700  000004                  ADD     #4,R0           ;ESTABLISH A POINTER TO FSRC.
 16526
 16527  075152  174410                  1$:     DIVF    (R0),AC0        ;TEST INSTRUCTION.
 16528
 16529  075154  170204                          STFPS   R4              ;GET THE FPS.
 16530  075156  012700  000200                  MOV     #200,R0         ;SET FD MODE
 16531  075162  170100                          LDFPS   R0
 16532
 16533  075164  012700  075230                  MOV     #DIVFT,R0       ;GET THE RESULT OF THE DIVF.
 16534  075170  174010                          STD     AC0,(R0)
 16535  075172  021061  000010                  CMP     (R0),10(R1)     ;IS THE RESULT CORRECT?
 16536  075176  001401                          BEQ     2$
 16537  075200  104000                          EMT                     ;
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16538  075202  026061  000002  000012  2$:     CMP     2(R0),12(R1)
16539  075210  001401                          BEQ     3$
16540  075212  104000                          EMT                     ;
16541  075214  026104  000016          3$:     CMP     16(R1),R4       ;IS FPS CORRECT?
16542  075220  001401                          BEQ     4$
16543  075222  104000                          EMT                     ;
16544  075224  000161  000020          4$:     JMP     20(R1)          ;IF NO ERRORS OCCURRED RETURN.
16545
16546  075230  000000  000000  000000  DIVFT:  .WORD   0,0,0,0
16547  075236  000000
16548
16549  075240                          CCCDONE:
16550  075240  004767  027326                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
16551                                                                  ;SEE IF THE USER HAS EXPRESSED
16552                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
16553                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
16554                                                                  ;THE USER TYPED CONTROL G?).
16555
16556
16557
16558                                   ;*****************************************************************************
16559                                   ;TEST 476       DIVD TEST
16560                                   ;*****************************************************************************
16561  075244                          TS476:
16562
16563                                   ;DIVD TEST WITH POSITIVE OPERANDS AND IN ROUND MODE.
16564  075244  004737  075610          DDD1:   JSR     PC,@#DIVDSUB
16565  075250  034277  000000  000000  1$:     .WORD   34277,0,0,0     ;AC
16566  075256  000000
16567  075260  040277  000000  000000  2$:     .WORD   40277,0,0,0     ;FSRC
16568  075266  000000
16569  075270  034200  000000  000000  3$:     .WORD   34200,0,0,0     ;RES
16570  075276  000000
16571  075300  000200                  4$:     200                     ;FPS BEFORE EXECUTION.
16572  075302  000200                          200                     ;FPS AFTER EXECUTION.
16573
16574                                   ;DIVD WITH AC NEGATIVE AND FSRC POSITIVE IN TRUNCATE MODE.
16575  075304  004737  075610          DDD2:   JSR     PC,@#DIVDSUB
16576  075310  134277  000000  000000  1$:     .WORD   134277,0,0,0    ;AC
16577  075316  000000
16578  075320  040277  000000  000000  2$:     .WORD   40277,0,0,0     ;FSRC
16579  075326  000000
16580  075330  134200  000000  000000  3$:     .WORD   134200,0,0,0    ;RES
16581  075336  000000
16582  075340  000207                  4$:     207                     ;FPS BEFORE EXECUTION.
16583  075342  000210                          210                     ;FPS AFTER EXECUTION.
16584
16585                                   ;DIVD TEST WITH OPERANDS BOTH NEGATIVE AND IN TRUNCATE MODE.
16586  075344  004767  000240          DDD3:   JSR     PC,DIVDSUB
16587  075350  134300  000000  000000  1$:     .WORD   134300,0,0,1    ;AC
16588  075356  000001
16589  075360  140300  000000  000000  2$:     .WORD   140300,0,0,0    ;FSRC
16590  075366  000000
16591  075370  034200  000000  000000  3$:     .WORD   34200,0,0,0     ;RES
16592  075376  000000
16593  075400  000250                  4$:     250                     ;FPS BEFORE EXECUTION.
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16594  075402  000240                          240                     ;FPS AFTER EXECUTION.
16595
16596                                          ;DIVD WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
16597  075404  004737  075610                  DDD4:   JSR     PC,@#DIVDSUB
16598  075410  034300  000000  000000          1$:     .WORD   34300,0,0,1     ;AC
16599  075416  000001
16600  075420  140300  000000  000000          2$:     .WORD   140300,0,0,0    ;FSRC
16601  075426  000000
16602  075430  134200  000000  000000          3$:     .WORD   134200,0,0,1    ;RES
16603  075436  000001
16604  075440  000207                          4$:     207                     ;FPS BEFORE EXECUTION.
16605  075442  000210                                  210                     ;FPS AFTER EXECUTION.
16606
16607                                          ;DIVD TEST.
16608  075444  004737  075610                  DDD5:   JSR     PC,@#DIVDSUB
16609  075450  100400  000000  000000          1$:     .WORD   100400,0,0,0    ;AC
16610  075456  000000
16611  075460  000500  000000  000000          2$:     .WORD   500,0,0,0       ;FSRC
16612  075466  000000
16613  075470  140052  125252                  3$:     .WORD   140052,125252   ;RES
16614  075474  125252  125252                          .WORD   125252,125252
16615  075500  007647                          4$:     7647                    ;FPS BEFORE EXECUTION.
16616  075502  007650                                  7650                    ;FPS AFTER EXECUTION.
16617
16618
16619                                          ;DIVD TEST WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
16620  075504  004737  075610                  DDD6:   JSR     PC,@#DIVDSUB
16621  075510  000400  000000  000000          1$:     .WORD   400,0,0,0       ;AC
16622  075516  000000
16623  075520  100500  000000  000000          2$:     .WORD   100500,0,0,0    ;FSRC
16624  075526  000000
16625  075530  140052  125252                  3$:     .WORD   140052,125252   ;RES
16626  075534  125252  125253                          .WORD   125252,125253
16627  075540  007707                          4$:     7707                    ;FPS BEFORE EXECUTION.
16628  075542  007710                                  7710                    ;FPS AFTER EXECUTION.
16629
16630                                          ;DIVD TEST.
16631  075544  004737  075610                  DDD7:   JSR     PC,@#DIVDSUB
16632  075550  170360  170360                  1$:     .WORD   170360,170360   ;AC
16633  075554  170360  170360                          .WORD   170360,170360
16634  075560  170360  170360                  2$:     .WORD   170360,170360   ;FSRC
16635  075564  170360  170360                          .WORD   170360,170360
16636  075570  040200  000000  000000          3$:     .WORD   40200,0,0,0     ;RES
16637  075576  000000
16638  075600  007717                          4$:     7717                    ;FPS BEFORE EXECUTION.
16639  075602  007700                                  7700                    ;FPS AFTER EXECUTION.
16640
16641  075604  000137  075732                          JMP     @#DDDDONE       ;GO TO NEXT TEST.
16642
16643
16644                                          ;THIS SUBROUTINE, DIVDSUB, IS CALLED TO SET UP, EXECUTE
16645                                          ;AND CHECK THE RESULT OF A DIVD INSTRUCTION. IT IS CALLED THUS:
16646                                          ;
16647                                          ;               JSR     PC,@#DIVDSUB
16648                                          ;       ACARG:  .WORD   X,X,X,X                 ;AC OPERAND
16649                                          ;       FSRCARG:.WORD   X,X,X,X                 ;FSRC OPERAND
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16650                                   ;       RES:    .WORD   X,X,X,X                 ;EXPECTED RESULT
16651                                   ;       FPSB:   .WORD   X                       ;FPS BEFORE EXECUTION
16652                                   ;       FPSA:   .WORD   X                       ;FPS AFTER EXECUTION
16653                                   ;       ERRES:  .WORD   X,X,X,X                 ;ERROR RESULT
16654                                   ;       ERR:    ERROR   X                       ;RESULT ERROR
16655                                   ;       CONT:                                   ;RETURN ADDRESS
16656                                   ;
16657                                   ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
16658                                   ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, DIVD IS EXECUTED.
16659                                   ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
16660                                   ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
16661                                   ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
16662                                   ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
16663                                   ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
16664                                   ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
16665                                   ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
16666                                   ;THEN THE FAILURE IS REPORTED IN DIVDSUB AND CONTROL IS PASSED TO
16667                                   ;CONT. IF NO ERRORS ARE DETECTED THEN DIVDSUB RETURNS CONTROL
16668                                   ;TO CONT.
16669
16670  075610  012601                   DIVDSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
16671  075612  012700  000200                   MOV     #200,R0         ;SET FD MODE.
16672  075616  170100                   LDFPS   R0
16673
16674  075620  010100                   MOV     R1,R0           ;SET UP THE AC0 OPERAND.
16675  075622  172410                   LDD     (R0),AC0
16676  075624  016100  000030           MOV     30(R1),R0       ;LOAD THE FPS.
16677  075630  170100                   LDFPS   R0
16678
16679  075632  010100                   MOV     R1,R0           ;ESTABLISH A POINTER TO FSRC.
16680  075634  062700  000010           ADD     #10,R0
16681
16682  075640  174410                   1$:     DIVD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
16683  075642  170204                   STFPS   R4              ;GET THE FPS.
16684  075644  012700  000200           MOV     #200,R0         ;SET FD MODE.
16685  075650  170100                   LDFPS   R0
16686  075652  012700  075722           MOV     #DIVDT,R0       ;GET THE RESULT.
16687  075656  174010                   STD     AC0,(R0)
16688  075660  010102                   MOV     R1,R2           ;CHECK THE RESULT.
16689  075662  062702  000020           ADD     #20,R2
16690  075666  012703  075722           MOV     #DIVDT,R3
16691  075672  012705  000004           MOV     #4,R5
16692  075676  022223                   2$:     CMP     (R2)+,(R3)+
16693  075700  001401                   BEQ     3$
16694  075702  104000                   EMT                     ;
16695  075704  077504                   3$:     SOB     R5,2$
16696
16697  075706  026104  000032           CMP     32(R1),R4       ;IS FPS CORRECT?
16698  075712  001401                   BEQ     4$
16699  075714  104000                   EMT                     ;
16700  075716  000161  000034           4$:     JMP     34(R1)          ;RETURN.
16701  075722  000000  000000  000000   DIVDT:  .WORD   0,0,0,0
16702  075730  000000                   .
16703
16704  075732                           DDDDONE:
16705  075732  004767  026634                   JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
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16706
16707
16708
16709
16710
16711
16712
16713                                   ;SEE IF THE USER HAS EXPRESSED
16714                                   ;THE DESIRE TO CHANGE THE SOFTWARE
16715                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
16716  075736                           ;THE USER TYPED CONTROL G?).
16717
16718                           ;*******************************************************************************
16719                           ;TEST 477       MULF TEST
16720                           ;*******************************************************************************
16721  075736                   TS477:
16722
16723                           ;MULF WITH (FSRC=AC=0)
16724  075736  004737  076346   EEE1:   JSR     PC,@#MULFSUB
16725  075742  000000  000000   1$:     .WORD   0,0             ;AC
16726  075746  000000  000000   2$:     .WORD   0,0             ;FSRC
16727  075752  000000  000000   3$:     .WORD   0,0             ;RES
16728  075756  007517           4$:     7517                    ;FPS BEFORE EXECUTION.
16729  075760  007504                   7504                    ;FPS AFTER EXECUTION.
16730
16731                           ;MULF WITH (FSRC=0).
16732  075762  004737  076346   EEE2:   JSR     PC,@#MULFSUB
16733  075766  071625  034435   1$:     .WORD   71625,34435     ;AC
16734  075772  000000  000000   2$:     .WORD   0,0             ;FSRC
16735  075776  000000  000000   3$:     .WORD   0,0             ;RES
16736  076002  000013           4$:     13                      ;FPS BEFORE EXECUTION.
16737  076004  000004                   4                       ;FPS AFTER EXECUTION.
16738
16739                           ;MULF WITH (AC=0)
16740  076006  004737  076346   EEE3:   JSR     PC,@#MULFSUB
16741  076012  000000  000000   1$:     .WORD   0,0             ;AC
16742  076016  071625  153443   2$:     .WORD   071625,153443   ;FSRC
16743  076022  000000  000000   3$:     .WORD   0,0             ;RES
16744  076026  007500           4$:     7500                    ;FPS BEFORE EXECUTION.
16745  076030  007504                   7504                    ;FPS AFTER EXECUTION.
16746
16747                           ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN ROUND MODE.
16748  076032  004737  076346   EEE4:   JSR     PC,@#MULFSUB
16749  076036  040200  000000   1$:     .WORD   40200,0         ;AC
16750  076042  040177  177777   2$:     .WORD   40177,-1        ;FSRC
16751  076046  040177  177777   3$:     .WORD   40177,-1        ;RES
16752  076052  000017           4$:     17                      ;FPS BEFORE EXECUTION.
16753  076054  000000                   0                       ;FPS AFTER EXECUTION.
16754
16755                           ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN TRUNCATE MODE.
16756  076056  004767  000264   EEE5:   JSR     PC,MULFSUB
16757  076062  040177  177777   1$:     .WORD   40177,-1        ;AC
16758  076066  040200  000000   2$:     .WORD   40200,0         ;FSRC
16759  076072  040177  177777   3$:     .WORD   40177,-1        ;RES
16760  076076  000040           4$:     40                      ;FPS BEFORE EXECUTION.
16761  076100  000040                   40                      ;FPS AFTER EXECUTION.
16762
16763                           ;MULF WITH BOTH OPERANDS POSITIVE NORMALIZE TEST.
16764  076102  004737  076346   EEE6:   JSR     PC,@#MULFSUB
16765  076106  040100  000000   1$:     .WORD   40100,0         ;AC
16766  076112  040100  000000   2$:     .WORD   40100,0         ;FSRC
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16762  076116  040020  000000  3$:     .WORD   40020,0          ;RES
16763  076122  000012          4$:     12                      ;FPS BEFORE EXECUTION.
16764  076124  000000                  0                       ;FPS AFTER EXECUTION.
16765
16766                          ;MULF WITH BOTH OPERANDS POSITIVE IN ROUND MODE.
16767  076126  004737  076346  EEE7:   JSR     PC,@#MULFSUB
16768  076132  017500  000000  1$:     .WORD   17500,0         ;AC
16769  076136  023652  125252  2$:     .WORD   23652,125252    ;FSRC
16770  076142  003177  177777  3$:     .WORD   3177,-1         ;RES
16771  076146  007417          4$:     7417                    ;FPS BEFORE EXECUTION.
16772  076150  007400                  7400                    ;FPS AFTER EXECUTION.
16773
16774                          ;MULF WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
16775  076152  004737  076346  EEE8:   JSR     PC,@#MULFSUB
16776  076156  040342  000000  1$:     .WORD   40342,0         ;AC
16777  076162  176542  000000  2$:     .WORD   176542,0        ;FSRC
16778  076166  176707  102000  3$:     .WORD   176707,102000   ;RES
16779  076172  000007          4$:     7                       ;FPS BEFORE EXECUTION.
16780  076174  000010                  10                      ;FPS AFTER EXECUTION.
16781
16782                          ;MULF WITH AC NEGATIVE AND FSRC POSITIVE IN ROUND MODE.
16783  076176  004737  076346  EEE9:   JSR     PC,@#MULFSUB
16784  076202  140200  000000  1$:     .WORD   140200,0        ;AC
16785  076206  007417  007417  2$:     .WORD   7417,7417       ;FSRC
16786  076212  107417  007417  3$:     .WORD   107417,7417     ;RES
16787  076216  000000          4$:     0                       ;FPS BEFORE EXECUTION.
16788  076220  000010                  10                      ;FPS AFTER EXECUTION.
16789
16790                          ;MULF WITH BOTH OPERANDS NEGATIVE IN ROUND MODE.
16791  076222  004737  076346  EEE10:  JSR     PC,@#MULFSUB
16792  076226  144600  000000  1$:     .WORD   144600,0        ;AC
16793  076232  154000  000000  2$:     .WORD   154000,0        ;FSRC
16794  076236  060400  000000  3$:     .WORD   60400,0         ;RES
16795  076242  000017          4$:     17                      ;FPS BEFORE EXECUTION.
16796  076244  000000                  0                       ;FPS AFTER EXECUTION.
16797
16798                          ;MULF BOTH OPERANDS NEGATIVE IN ROUND MODE.
16799  076246  004737  076346  EEE11:  JSR     PC,@#MULFSUB
16800  076252  140300  000000  1$:     .WORD   140300,0        ;AC
16801  076256  160000  000001  2$:     .WORD   160000,1        ;FSRC
16802  076262  060100  000002  3$:     .WORD   60100,2         ;RES
16803  076266  000010          4$:     10                      ;FPS BEFORE EXECUTION.
16804  076270  000000                  0                       ;FPS AFTER EXECUTION.
16805
16806                          ;MULF WITH AC POSITIVE AND FSRC NEGATIVE IN TRUNCATE MODE.
16807  076272  004737  076346  EEE12:  JSR     PC,@#MULFSUB
16808  076276  060000  000001  1$:     .WORD   60000,1         ;AC
16809  076302  140300  000000  2$:     .WORD   140300,0        ;FSRC
16810  076306  160100  000001  3$:     .WORD   160100,1        ;RES
16811  076312  007547          4$:     7547                    ;FPS BEFORE EXECUTION.
16812  076314  007550                  7550                    ;FPS AFTER EXECUTION.
16813
16814                          ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN ROUND MODE.
16815  076316  004737  076346  EEE13:  JSR     PC,@#MULFSUB
16816  076322  040277  000000  1$:     .WORD   40277,0         ;AC
16817  076326  060000  000001  2$:     .WORD   60000,1         ;FSRC
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16818  076332  060077  000001          3$:     .WORD   60077,1          ;RES
16819  076336  000014                  4$:     14                      ;FPS BEFORE EXECUTION.
16820  076340  000000                          0                       ;FPS AFTER EXECUTION.
16821
16822  076342  000167  000116                  JMP     EEEDONE         ;GO TO THE NEXT TEST.
16823
16824                                  ;THIS SUBROUTINE, MULFSUB, IS CALLED TO SET UP, EXECUTE
16825                                  ;AND CHECK THE RESULT OF A MULF INSTRUCTION. IT IS CALLED THUS:
16826                                  ;
16827                                  ;               JSR     PC,@#MULFSUB
16828                                  ;       ACARG:  .WORD   X,X             ;AC OPERAND
16829                                  ;       FSRCARG:.WORD   X,X             ;FSRC OPERAND
16830                                  ;       RES:    .WORD   X,X             ;EXPECTED RESULT
16831                                  ;       FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
16832                                  ;       FPSA:   .WORD   X               ;FPS AFTER EXECUTION
16833                                  ;       ERRES:  .WORD   X,X             ;ERROR RESULT
16834                                  ;       ERR:    ERROR   X               ;RESULT ERROR
16835                                  ;       CONT:                           ;RETURN ADDRESS
16836                                  ;
16837                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
16838                                  ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, MULF IS EXECUTED.
16839                                  ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
16840                                  ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
16841                                  ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
16842                                  ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
16843                                  ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
16844                                  ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
16845                                  ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
16846                                  ;THEN THE FAILURE IS REPORTED IN MULFSUB AND CONTROL IS PASSED TO
16847                                  ;CONT. IF NO ERRORS ARE DETECTED THEN MULFSUB RETURNS CONTROL
16848                                  ;TO CONT.
16849
16850  076346  012601                  MULFSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
16851  076350  012700  000200                  MOV     #200,R0         ;SET FD MODE.
16852  076354  170100                  LDFPS   R0
16853  076356  010100                  MOV     R1,R0           ;LOAD THE AC OPERAND.
16854  076360  172410                  LDD     (R0),AC0
16855  076362  016100  000014                  MOV     14(R1),R0       ;LOAD THE FPS
16856  076366  170100                  LDFPS   R0
16857  076370  010100                  MOV     R1,R0
16858  076372  062700  000004                  ADD     #4,R0           ;ESTABLISH A POINTER TO FSRC.
16859
16860  076376  171010                  1$:     MULF    (R0),AC0        ;TEST INSTRUCTION.
16861
16862  076400  170204                  STFPS   R4              ;GET THE FPS.
16863  076402  012700  000200                  MOV     #200,R0         ;SET FD MODE
16864  076406  170100                  LDFPS   R0
16865
16866  076410  012700  076454                  MOV     #MULFT,R0       ;GET THE RESULT OF THE MULF.
16867  076414  174010                  STD     AC0,(R0)
16868  076416  021061  000010                  CMP     (R0),10(R1)     ;IS THE RESULT CORRECT?
16869  076422  001401                  BEQ     2$
16870  076424  104000                  EMT                     ;
16871  076426  026061  000002  000012  2$:     CMP     2(R0),12(R1)
16872  076434  001401                  BEQ     3$
16873  076436  104000                  EMT                     ;
```

```
16874  076440  026104  000016          3$:     CMP     16(R1),R4       ;IS FPS CORRECT?
16875  076444  001401                          BEQ     4$
16876  076446  104000                          EMT                     ;
16877  076450  000161  000020          4$:     JMP     20(R1)          ;IF NO ERRORS OCCURRED RETURN.
16878
16879  076454  000000  000000  000000  MULFT:  .WORD   0,0,0,0
16880  076462  000000
16881
16882  076464                          EEEDONE:
16883  076464  004767  026102                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
16884                                                                  ;SEE IF THE USER HAS EXPRESSED
16885                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
16886                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
16887                                                                  ;THE USER TYPED CONTROL G?).
16888
16889
16890
16891                                  ;*****************************************************************************************
16892                                  ;TEST 500       MULD TEST
16893                                  ;*****************************************************************************************
16894  076470                          TS500:
16895
16896                                  ;MULD TEST WITH AC POSITIVE AND FSRC POSITIVE.
16897  076470  004737  076674          FFF1:   JSR     PC,@#MULDSUB
16898  076474  040200  000000  000000  1$:     .WORD   40200,0,0,0     ;AC
16899  076502  000000
16900  076504  023777  177777  177777  2$:     .WORD   23777,-1,-1,-1  ;FSRC
16901  076512  177777
16902  076514  023777  177777  177777  3$:     .WORD   23777,-1,-1,-1  ;RES
16903  076522  177777
16904  076524  000217                  4$:     217                     ;FPS BEFORE EXECUTION.
16905  076526  000200                          200                     ;FPS AFTER ECECUTION.
16906
16907                                  ;MULD TEST WITH BOTH OPERANDS POSITIVE TRUNCATION TEST.
16908  076530  004767  000140          FFF2:   JSR     PC,MULDSUB
16909  076534  065400  000000  000000  1$:     .WORD   65400,0,0,1     ;AC
16910  076542  000001
16911  076544  037577  177777  177777  2$:     .WORD   37577,-1,-1,-2  ;FSRC
16912  076552  177776
16913  076554  064777  177777  177777  3$:     .WORD   64777,-1,-1,-1  ;RES
16914  076562  177777
16915  076564  000247                  4$:     247                     ;FPS BEFORE EXECUTION.
16916  076566  000240                          240                     ;FPS AFTER EXECUTION.
16917
16918                                  ;MULD TEST WITH BOTH OPERANDS NEGATIVE IN ROUND MODE.
16919  076570  004737  076674          FFF3:   JSR     PC,@#MULDSUB
16920  076574  137577  177777  177777  1$:     .WORD   137577,-1,-1,-2 ;AC
16921  076602  177776
16922  076604  165400  000000  000000  2$:     .WORD   165400,0,0,1    ;FSRC
16923  076612  000001
16924  076614  065000  000000  000000  3$:     .WORD   65000,0,0,0     ;RES
16925  076622  000000
16926  076624  007717                  4$:     7717                    ;FPS BEFORE EXECUTION.
16927  076626  007700                          7700                    ;FPS AFTER EXECUTION.
16928
16929                                  ;MULD   TEST WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
```

```
16930  076630  004737  076674            FFF4:   JSR     PC,@#MULDSUB
16931  076634  017500  000000  000000    1$:     .WORD   17500,0,0,0     ;AC
16932  076642  000000
16933  076644  123652  125252            2$:     .WORD   123652,125252   ;FSRC
16934  076650  125252  125252                    .WORD   125252,125252
16935  076654  103177  177777  177777    3$:     .WORD   103177,-1,-1,-1 ;RES
16936  076660  177777
16937  076664  000200                    4$:     200                     ;FPS BEFORE EXECUTION.
16938  076666  000210                            210                     ;FPS AFTER EXECUTION.
16939
16940  076670  000167  000122                    JMP     FFFDONE
16941
16942                                    ;THIS SUBROUTINE, MULDSUB, IS CALLED TO SET UP, EXECUTE
16943                                    ;AND CHECK THE RESULT OF A MULD INSTRUCTION. IT IS CALLED THUS:;
16944                                    ;               JSR     PC,@#MULDSUB
16945                                    ;       ACARG:  .WORD   X,X,X,X                 ;AC OPERAND
16946                                    ;       FSRCARG:.WORD   X,X,X,X                 ;FSRC OPERAND
16947                                    ;       RES:    .WORD   X,X,X,X                 ;EXPECTED RESULT
16948                                    ;       FPSB:   .WORD   X                       ;FPS BEFORE EXECUTION
16949                                    ;       FPSA:   .WORD   X                       ;FPS AFTER EXECUTION
16950                                    ;       ERRES:  .WORD   X,X,X,X                 ;ERROR RESULT
16951                                    ;       ERR:    ERROR   X                       ;RESULT ERROR
16952                                    ;       CONT:                                   ;RETURN ADDRESS
16953                                    ;
16954                                    ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
16955                                    ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, MULD IS EXECUTED.
16956                                    ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
16957                                    ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
16958                                    ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
16959                                    ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
16960                                    ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
16961                                    ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
16962                                    ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
16963                                    ;THEN THE FAILURE IS REPORTED IN MULDSUB AND CONTROL IS PASSED TO
16964                                    ;CONT. IF NO ERRORS ARE DETECTED THEN MULDSUB RETURNS CONTROL
16965                                    ;TO CONT.
16966
16967  076674  012601                    MULDSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
16968  076676  012700  000200                    MOV     #200,R0         ;SET FD MODE.
16969  076702  170100                            LDFPS   R0
16970
16971  076704  010100                            MOV     R1,R0           ;SET UP THE AC0 OPERAND.
16972  076706  172410                            LDD     (R0),AC0
16973  076710  016100  000030                    MOV     30(R1),R0       ;LOAD THE FPS.
16974  076714  170100                            LDFPS   R0
16975
16976  076716  010100                            MOV     R1,R0           ;ESTABLISH A POINTER TO FSRC.
16977  076720  062700  000010                    ADD     #10,R0
16978
16979  076724  171010                    1$:     MULD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
16980
16981  076726  170204                            STFPS   R4              ;GET THE FPS.
16982  076730  012700  000200                    MOV     #200,R0         ;SET FD MODE.
16983  076734  170100                            LDFPS   R0
16984
16985  076736  012700  077006                    MOV     #MULDT,R0       ;GET THE RESULT.
```

```
 16986  076742  174010                          STD     AC0,(R0)
 16987  076744  010102                          MOV     R1,R2           ;CHECK THE RESULT.
 16988  076746  062702  000020                  ADD     #20,R2
 16989  076752  012703  077006                  MOV     #MULDT,R3
 16990  076756  012705  000004                  MOV     #4,R5
 16991  076762  022223                  2$:     CMP     (R2)+,(R3)+
 16992  076764  001401                          BEQ     3$
 16993  076766  104000                          EMT                     ;
 16994  076770  077504                  3$:     SOB     R5,2$
 16995
 16996  076772  026104  000032                  CMP     32(R1),R4       ;IS FPS CORRECT?
 16997  076776  001401                          BEQ     4$
 16998  077000  104000                          EMT                     ;
 16999  077002  000161  000034          4$:     JMP     34(R1)          ;RETURN.
 17000
 17001  077006  000000  000000  000000  MULDT:  .WORD   0,0,0,0
 17002  077014  000000
 17003  077016                          FFFDONE:
 17004  077016  004767  025550                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
 17005                                                                  ;SEE IF THE USER HAS EXPRESSED
 17006                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 17007                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 17008                                                                  ;THE USER TYPED CONTROL G?).
 17009
 17010
 17011
 17012                                  ;*****************************************************************************
 17013                                  ;TEST 501       UNDER\OVER FLOW, USING MULF WITH TRAPS DISABLED, TEST
 17014                                  ;*****************************************************************************
 17015  077022                          TS501:
 17016
 17017                                  ;UNDERFLOW, WITH EXPONENT OF RESULT = -129
 17018  077022  004737  077166          1111:   JSR     PC,@#OVUNFNT
 17019  077026  020200  000000          1$:     .WORD   20200,0         ;AC
 17020  077032  020000  000000          2$:     .WORD   20000,0         ;FSRC
 17021  077036  000000  000000          3$:     .WORD   0,0             ;RES
 17022  077042  000000                  5$:     0                       ;FPS BEFORE EXECUTION.
 17023  077044  000004                          4                       ;FPS AFTER EXECUTION.
 17024  077046  000012                  6$:     12                      ;FEC
 17025  077050  177777                          -1                      ;FLAG
 17026
 17027                                  ;UNDERFLOW, WITH EXPONENT OF RESULT = -193
 17028  077052  004737  077166          1112:   JSR     PC,@#OVUNFNT
 17029  077056  010200  000000          1$:     .WORD   10200,0         ;AC
 17030  077062  010000  000000          2$:     .WORD   10000,0         ;FSRC
 17031  077066  000000  000000          3$:     .WORD   0,0             ;RES
 17032  077072  005013                  5$:     5013                    ;FPS BEFORE EXECUTION.
 17033  077074  005004                          5004                    ;FPS AFTER EXECUTION.
 17034  077076  000012                  6$:     12                      ;FEC
 17035  077100  177777                          -1                      ;FLAG
 17036                                  ;OVERFLOW, EXPONENT OF RESULT = 128
 17037  077102  004737  077166          1113:   JSR     PC,@#OVUNFNT
 17038  077106  060200  000000          1$:     .WORD   60200,0         ;AC
 17039  077112  060000  000000          2$:     .WORD   60000,0         ;FSRC
 17040  077116  000000  000000          3$:     .WORD   0,0             ;RES
 17041  077122  000000                  5$:     0                       ;FPS BEFORE EXECUTION.
```

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17042  077124  000006                  6                       ;FPS AFTER EXECUTION.
17043  077126  000010          6$:     10                      ;FEC
17044  077130  000000                  0                       ;FLAG
17045                          ;OVERFLOW, EXPONENT OF RESULT = 130
17046  077132  004737  077166  III4:   JSR     PC,@#OVUNFNT
17047  077136  060200  000000  1$:     .WORD   60200,0         ;AC
17048  077142  060200  000000  2$:     .WORD   60200,0         ;FSRC
17049  077146  000000  000000  3$:     .WORD   0,0             ;RES
17050  077152  006011          5$:     6011                    ;FPS BEFORE EXECUTION.
17051  077154  006006                  6006                    ;FPS AFTER EXECUTION.
17052  077156  000010          6$:     10                      ;FEC
17053  077160  000000                  0                       ;FLAG
17054  077162  000167  000132  8$:     JMP     IIIDONE         ;GO TO NEXT TEST.
17055
17056
17057
17058                          ;THIS SUBROUTINE, OVUNFNT, IS USED TO SET UP THE OPERANDS, EXECUTE
17059                          ;THE MULF INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
17060                          ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
17061                          ;TO IT IS MADE THUS:
17062                          ;
17063                          ;               ACARG:  .WORD   X,X             ;AC OPERAND
17064                          ;               FSRCARG:.WORD   X,X             ;FSRC OPERAND
17065                          ;               RES:    .WORD   X,X             ;EXPECTED RESULT
17066                          ;               ERRES:  .WORD   X,X             ;ERROR RESULT
17067                          ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
17068                          ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
17069                          ;               FEC:    .WORD   X               ;EXPECTED FEC
17070                          ;               FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
17071                          ;               ERR1:   ERROR   X               ;TRAP ERROR.
17072                          ;               BR      CONT
17073                          ;               ERR2:   ERROR   X               ;DATA, RESULT ERROR
17074                          ;               CONT:                           ;RETURN ADDRESS
17075                          ;
17076                          ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
17077                          ;THE MULF INSTRUCTION IS EXECUTED. IF NO TRAP OCCURS THEN THE
17078                          ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
17079                          ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNFNT RETURNS CONTROL
17080                          ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNFNT
17081                          ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
17082                          ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
17083                          ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
17084                          ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNFNT
17085                          ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
17086                          ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNFNT WILL
17087                          ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
17088                          ;IF A TRAP OCCURS (IT SHOULD NOT) THEN OVUNFNT WILL READ THE FEC.
17089                          ;SHOULD THE FEC MATCH THE ANTICIPATED FEC OVUNFNT WILL
17090                          ;STORE ALL DATA AND TRANSFER CONTROL TO THE ERROR CALL AT ERR1. IF THE
17091                          ;FEC IS NOT THE SAME AS THE ANTICIPATED FEC OVUNFNT WILL REPORT
17092                          ;THE ERROR AND RETURN TO CONT. NOTE THAT OVUNFNT USES THE FLAG
17093                          ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
17094                          ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).
17095
17096  077166  012601          OVUNFNT:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
17097  077170  012700  000200          MOV     #200,R0         ;SET FD MODE.
```

```
17098  077174  170100                          LDFPS   R0
17099
17100  077176  010100                          MOV     R1,R0           ;LOAD AC0, OPERAND.
17101  077200  172410                          LDD     (R0),AC0
17102  077202  016100  000014                  MOV     14(R1),R0       ;LOAD THE FPS
17103  077206  170100                          LDFPS   R0
17104  077210  012737  077270  000244          MOV     #25$,@#FPVECT   ;SET UP THE FP TRAP VECTOR IN CASE
17105                                                                  ;OF ERROR.
17106  077216  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
17107  077220  062700  000004                  ADD     #4,R0
17108
17109  077224  171010                  1$:     MULF    (R0),AC0        ;TEST INSTRUCTION.
17110
17111  077226  170204                  2$:     STFPS   R4              ;GET FPS.
17112  077230  170305                          STST    R5              ;GET FEC.
17113  077232  012700  000200                  MOV     #200,R0         ;SET FD MODE.
17114  077236  170100                          LDFPS   R0
17115  077240  012700  077310                  MOV     #OVFNTT,R0      ;GET THE RESULT.
17116  077244  174010                          STD     AC0,(R0)
17117  077246  012700  077310                  MOV     #OVFNTT,R0      ;CHECK THE RESULT.
17118  077252  010102                          MOV     R1,R2
17119  077254  062702  000010                  ADD     #10,R2
17120  077260  012703  000002                  MOV     #2,R3
17121  077264  022022                  3$:     CMP     (R0)+,(R2)+
17122  077266  001401                          BEQ     5$
17123  077270                          25$:
17124  077270  104000                          EMT                     ;
17125  077272  077304                  5$:     SOB     R3,3$
17126
17127  077274  026104  000016                  CMP     16(R1),R4       ;WAS FPS CORRECT?
17128  077300  001401                          BEQ     4$
17129  077302  104000                          EMT                     ;
17130  077304  000161  000024          4$:     JMP     24(R1)          ;RETURN, TEST COMPLETED.
17131
17132  077310  000000  000000  000000  OVFNTT: .WORD   0,0,0,0
17133  077316  000000
17134
17135  077320                          IIIDONE:
17136  077320  004767  025246                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
17137                                                                  ;SEE IF THE USER HAS EXPRESSED
17138                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
17139                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
17140                                                                  ;THE USER TYPED CONTROL G?).
17141
17142
17143
17144
17145                                  ;*****************************************************************************
17146                                  ;TEST 502       UNDER\OVER FLOW, USING MULD WITH TRAP DISABLED, TEST
17147                                  ;*****************************************************************************
17148  077324                          TS502:
17149
17150                                  ;UNDERFLOW, EXPONENT OF RESULT=-129
17151  077324  004737  077550          JJJ1:   JSR     PC,@#OVUNDNT
17152  077330  020200  000000          1$:     .WORD   20200,0         ;AC
17153  077334  127272  000000                  .WORD   127272,0
```

```
17154  077340  020000  000000  000000  2$:     .WORD   20000,0,0,0      ;FSRC
17155  077346  000000
17156  077350  000000  000000  000000  3$:     .WORD   0,0,0,0          ;RES
17157  077356  000000
17158  077360  000200                  5$:     200                      ;FPS BEFORE EXECUTION.
17159  077362  000204                          204                      ;FPS AFTER EXECUTION.
17160  077364  000012                  6$:     12                       ;FEC
17161  077366  177777                          -1                       ;FLAG
17162
17163                                  ;UNDERFLOW, EXPONENT OF RESULT = -193
17164  077370  004737  077550          JJJ2:   JSR     PC,@#OVUNDNT
17165  077374  010200  000000          1$:     .WORD   10200,0          ;AC
17166  077400  123456  000000                  .WORD   123456,0
17167  077404  010000  000000  000000  2$:     .WORD   10000,0,0,0      ;FSRC
17168  077412  000000
17169  077414  000000  000000  000000  3$:     .WORD   0,0,0,0          ;RES
17170  077422  000000
17171  077424  005213                  5$:     5213                     ;FPS BEFORE EXECUTION.
17172  077426  005204                          5204                     ;FPS AFTER EXECUTION.
17173  077430  000012                  6$:     12                       ;FEC
17174  077432  177777                          -1                       ;FLAG
17175
17176                                  ;OVERFLOW, EXPONENT OF RESULT = 128
17177  077434  004737  077550          JJJ3:   JSR     PC,@#OVUNDNT
17178  077440  060200  000000          1$:     .WORD   60200,0          ;AC
17179  077444  065432  000000                  .WORD   65432,0
17180  077450  060000  000000  000000  2$:     .WORD   60000,0,0,0      ;FSRC
17181  077456  000000
17182  077460  000000  000000  000000  3$:     .WORD   0,0,0,0          ;RES
17183  077466  000000
17184  077470  000200                  5$:     200                      ;FPS BEFORE EXECUTION.
17185  077472  000206                          206                      ;FPS AFTER EXECUTION.
17186  077474  000010                  6$:     10                       ;FEC
17187  077476  000000                          0                        ;FLAG
17188
17189                                  ;OVERFLOW, EXPONENT OF RESULT = 130
17190  077500  004737  077550          JJJ4:   JSR     PC,@#OVUNDNT
17191  077504  060200  000000          1$:     .WORD   60200,0          ;AC
17192  077510  125252  000000                  .WORD   125252,0
17193  077514  060200  000000  000000  2$:     .WORD   60200,0,0,0      ;FSRC
17194  077522  000000
17195  077524  000000  000000  000000  3$:     .WORD   0,0,0,0          ;RES
17196  077532  000000
17197  077534  006211                  5$:     6211                     ;FPS BEFORE EXECUTION.
17198  077536  006206                          6206                     ;FPS AFTER EXECUTION.
17199  077540  000010                  6$:     10                       ;FEC
17200  077542  000000                          0                        ;FLAG
17201  077544  000137  077702          8$:     JMP     @#JJJDONE        ;GO TO NEXT TEST
17202
17203                                  ;THIS SUBROUTINE, OVUNDNT, IS USED TO SET UP THE OPERANDS, EXECUTE
17204                                  ;THE MULD INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
17205                                  ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
17206                                  ;TO IT IS MADE THUS:
17207                                  ;
17208                                  ;               ACARG:  .WORD   X,X,X,X          ;AC OPERAND
17209                                  ;               FSRCARG:.WORD   X,X,X,X          ;FSRC OPERAND
```

```
17210                                   ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
17211                                   ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
17212                                   ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
17213                                   ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
17214                                   ;               FEC:    .WORD   X               ;EXPECTED FEC
17215                                   ;               FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
17216                                   ;               ERR1:   ERROR   X               ;TRAP ERROR.
17217                                   ;               BR      CONT
17218                                   ;               ERR2:   ERROR   X               ;DATA, RESULT ERROR
17219                                   ;               CONT:                           ;RETURN ADDRESS
17220                                   ;
17221                                   ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
17222                                   ;THE MULD INSTRUCTION IS EXECUTED. IF NO TRAP OCCURS THEN THE
17223                                   ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
17224                                   ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNDNT RETURNS CONTROL
17225                                   ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNDNT
17226                                   ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
17227                                   ;MULD IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
17228                                   ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
17229                                   ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNDNT
17230                                   ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
17231                                   ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNDNT WILL
17232                                   ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
17233                                   ;IF A TRAP OCCURS (IT SHOULD NOT) THEN OVUNDNT WILL READ THE FEC.
17234                                   ;SHOULD THE FEC MATCH THE ANTICIPATED FEC OVUNDNT WILL
17235                                   ;STORE ALL DATA AND TRANSFER CONTROL TO THE ERROR CALL AT ERR1. IF THE
17236                                   ;FEC IS NOT THE SAME AS THE ANTICIPATED FEC OVUNDNT WILL REPORT
17237                                   ;THE ERROR AND RETURN TO CONT. NOTE THAT OVUNDNT USES THE FLAG
17238                                   ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
17239                                   ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).
17240
17241  077550  012601                  OVUNDNT:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
17242  077552  012700  000200                  MOV     #200,R0         ;SET FD MODE.
17243  077556  170100                  LDFPS   R0
17244
17245  077560  010100                  MOV     R1,R0           ;LOAD AC0, OPERAND.
17246  077562  172410                  LDD     (R0),AC0
17247  077564  016100  000030          MOV     30(R1),R0       ;LOAD THE FPS.
17248  077570  170100                  LDFPS   R0
17249  077572  012737  077652  000244  MOV     #25$,@#FPVECT   ;SET UP THE FP TRAP VECTOR IN CASE
17250                                                          ;OF ERROR.
17251  077600  010100                  MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
17252  077602  062700  000010          ADD     #10,R0
17253
17254  077606  171010                  1$:     MULD    (R0),AC0        ;TEST INSTRUCTION.
17255
17256  077610  170204                  2$:     STFPS   R4              ;GET FPS.
17257  077612  170305                  STST    R5              ;GET FEC.
17258  077614  012700  000200          MOV     #200,R0         ;SET FD MODE.
17259  077620  170100                  LDFPS   R0
17260  077622  012700  077672          MOV     #OVDNTT,R0      ;GET THE RESULT.
17261  077626  174010                  STD     AC0,(R0)
17262  077630  012700  077672          MOV     #OVDNTT,R0      ;CHECK THE RESULT.
17263  077634  010102                  MOV     R1,R2
17264  077636  062702  000020          ADD     #20,R2
17265  077642  012703  000004          MOV     #4,R3
```

```
17266  077646  022022                  3$:     CMP     (R0)+,(R2)+
17267  077650  001401                          BEQ     5$
17268  077652                          25$:
17269  077652  104000                          EMT                     ;
17270  077654  077304                  5$:     SOB     R3,3$
17271
17272  077656  026104  000032                  CMP     32(R1),R4       ;WAS FPS CORRECT?
17273  077662  001401                          BEQ     4$
17274  077664  104000                          EMT                     ;
17275  077666  000161  000040          4$:     JMP     40(R1)          ;RETURN, TEST COMPLETED.
17276
17277  077672  000000  000000  000000  OVDNTT: .WORD   0,0,0,0
17278  077700  000000
17279
17280  077702                          JJJDONE:
17281  077702  004767  024664                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
17282                                                                  ;SEE IF THE USER HAS EXPRESSED
17283                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
17284                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
17285                                                                  ;THE USER TYPED CONTROL G?).
17286
17287
17288
17289
17290                                  ;*****************************************************************************
17291                                  ;TEST 503       UNDER\OVER FLOW, USING MULF WITH TRAPS ENABLED, TEST
17292                                  ;*****************************************************************************
17293  077706                          TS503:
17294
17295                                  ;UNDERFLOW, EXPONENT OF RESULT = -129
17296  077706  004737  100052          KKK1:   JSR     PC,@#OVUNFT
17297  077712  020123  045676          1$:     .WORD   20123,45676     ;AC
17298  077716  020200  000000          2$:     .WORD   20200,0         ;FSRC
17299  077722  000123  045676          3$:     .WORD   123,45676       ;RES
17300  077726  002000                  5$:     2000                    ;FPS BEFORE EXECUTION.
17301  077730  102004                          102004                  ;FPS AFTER EXECUTION.
17302  077732  000012                  6$:     12                      ;FEC
17303  077734  177777                          -1                      ;FLAG
17304
17305                                  ;UNDERFLOW, EXPONENT OF THE RESULT = -193
17306  077736  004737  100052          KKK3:   JSR     PC,@#OVUNFT
17307  077742  010127  127272          1$:     .WORD   10127,127272    ;AC
17308  077746  010200  000000          2$:     .WORD   10200,0         ;FSRC
17309  077752  060127  127272          3$:     .WORD   60127,127272    ;RES
17310  077756  007017                  5$:     7017                    ;FPS BEFORE EXECUTION.
17311  077760  107000                          107000                  ;FPS AFTER EXECUTION.
17312  077762  000012                  6$:     12                      ;FEC
17313  077764  177777                          -1
17314
17315                                  ;OVERFLOW, EXPONENT OF THE RESULT = 128
17316  077766  004737  100052          KKK4:   JSR     PC,@#OVUNFT
17317  077772  060252  125252          1$:     .WORD   60252,125252    ;AC
17318  077776  060000  000000          2$:     .WORD   60000,0         ;FSRC
17319  100002  000052  125252          3$:     .WORD   000052,125252   ;RES
17320  100006  001000                  5$:     1000                    ;FPS BEFORE EXECUTION.
17321  100010  101006                          101006                  ;FPS AFTER EXECUTION.
```

```
17322  100012  000010                  6$:     10                      ;FEC
17323  100014  000000                          0                       ;FLAG
17324
17325                                  ;OVERFLOW, EXPONENT OF RESULT = 130
17326  100016  004737  100052          KKK5:   JSR     PC,@#OVUNFT
17327  100022  060345  067654          1$:     .WORD   60345,67654     ;AC
17328  100026  060200  000000          2$:     .WORD   60200,0         ;FSRC
17329  100032  000345  067654          3$:     .WORD   345,67654       ;RES
17330  100036  007015                  5$:     7015                    ;FPS BEFORE EXECUTION.
17331  100040  107002                          107002                  ;FPS AFTER EXECUTION.
17332  100042  000010                  6$:     10                      ;FEC
17333  100044  000000                          0                       ;FLAG
17334  100046  000167  000162          8$:     JMP     KKKDONE
17335
17336                                  ;THIS SUBROUTINE, OVUNFT, IS USED TO SET UP THE OPERANDS, EXECUTE
17337                                  ;THE MULF INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
17338                                  ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
17339                                  ;TO IT IS MADE THUS:
17340                                  ;
17341                                  ;               ACARG:  .WORD   X,X             ;AC OPERAND
17342                                  ;               FSRCARG:.WORD   X,X             ;FSRC OPERAND
17343                                  ;               RES:    .WORD   X,X             ;EXPECTED RESULT
17344                                  ;               ERRES:  .WORD   X,X             ;ERROR RESULT
17345                                  ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
17346                                  ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
17347                                  ;               FEC:    .WORD   X               ;EXPECTED FEC
17348                                  ;               FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
17349                                  ;               ERR1:   ERROR   X               ;TRAP ERROR.
17350                                  ;               BR      CONT
17351                                  ;               ERR2:   ERROR   X               ;DATA, RESULT ERROR
17352                                  ;               CONT:                           ;RETURN ADDRESS
17353                                  ;
17354                                  ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
17355                                  ;THE MULF INSTRUCTION IS EXECUTED. IF THE TRAP OCCURS THEN THE
17356                                  ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
17357                                  ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNFT RETURNS CONTROL
17358                                  ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNFT
17359                                  ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. THE FEC IS TREATED
17360                                  ;IN THE SAME WAY. IF THE RESULT OF THE
17361                                  ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
17362                                  ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
17363                                  ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNFT
17364                                  ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
17365                                  ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNFT WILL
17366                                  ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
17367                                  ;IF NO TRAP OCCURS CONTROL IS PASSED TO ERR1.
17368                                  ;NOTE THAT OVUNFNT USES THE FLAG
17369                                  ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
17370                                  ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).
17371
17372  100052  012601                  OVUNFT: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
17373  100054  012700  000200                  MOV     #200,R0         ;SET FD MODE.
17374  100060  170100                          LDFPS   R0
17375  100062  010100                          MOV     R1,R0           ;LOAD AC0, OPERAND.
17376  100064  172410                          LDD     (R0),AC0
17377  100066  016100  000014                  MOV     14(R1),R0       ;LOAD THE FPS.
```

```
17378  100072  170100                          LDFPS   R0
17379  100074  012737  100116  000244          MOV     #50$,@#FPVECT   ;SET UP THE FP TRAP VECTOR IN CASE
17380                                                                  ;OF ERROR.
17381  100102  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
17382  100104  062700  000004                  ADD     #4,R0
17383
17384  100110  171010                  1$:     MULF    (R0),AC0        ;TEST INSTRUCTION. SHOULD CAUSE TRAP.
17385  100112  170000                  2$:     CFCC
17386  100114  104000                          EMT                     ;
17387  100116  011602                  50$:    MOV     (SP),R2         ;TRAP TO HERE AND SEE IF THE PC OF THE
17388  100120  020227  100'12                 CMP     R2,#2$          ;TRAP WAS THAT OF THE MULF INSTRUCTION.
17389  100124  001401                          BEQ     51$
17390  100126  104000                          EMT                     ;
17391  100130  022626                  51$:    CMP     (SP)+,(SP)+     ;RESET THE STACK
17392  100132  170204                          STFPS   R4              ;GET FPS.
17393  100134  170305                          STST    R5              ;GET FEC.
17394  100136  012700  000200                  MOV     #200,R0         ;SET FD MODE.
17395  100142  170100                          LDFPS   R0
17396  100144  012700  100224                  MOV     #OVFTT,R0       ;GET THE RESULT.
17397  100150  174010                          STD     AC0,(R0)
17398  100152  012700  100224                  MOV     #OVFTT,R0       ;CHECK THE RESULT.
17399  100156  010102                          MOV     R1,R2
17400  100160  062702  000010                  ADD     #10,R2
17401  100164  012703  000002                  MOV     #2,R3
17402  100170  022022                  3$:     CMP     (R0)+,(R2)+
17403  100172  001401                          BEQ     5$
17404  100174  104000                          EMT                     ;
17405  100176  077304                  5$:     SOB     R3,3$
17406
17407  100200  026104  000016                  CMP     16(R1),R4       ;WAS FPS CORRECT?
17408  100204  001401                          BEQ     6$
17409  100206  104000                          EMT                     ;
17410  100210  026105  000020          6$:     CMP     20(R1),R5       ;IS FEC CORRECT?
17411  100214  001401                          BEQ     4$
17412  100216  104000                          EMT                     ;
17413  100220  000161  000024          4$:     JMP     24(R1)          ;RETURN, TEST COMPLETED.
17414
17415  100224  000000  000000  000000  OVFTT:  .WORD   0,0,0,0
17416  100232  000000
17417
17418  100234                          KKKDONE:
17419  100234  004767  024332                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
17420                                                                  ;SEE IF THE USER HAS EXPRESSED
17421                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
17422                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
17423                                                                  ;THE USER TYPED CONTROL G?).
17424
17425
17426
17427
17428                                  ;*****************************************************************************
17429                                  ;TEST 504       UNDER\OVER FLOW, USING MULD WITH TRAPS ENABLED, TEST
17430                                  ;*****************************************************************************
17431  100240                          TS504:
17432
17433                                  ;UNDERFLOW, EXPONENT OF RESULT = -129
```

```
17434  100240  004737  100464          LLL1:   JSR     PC,@#OVUNDT
17435  100244  020052  125252          1$:     .WORD   20052,125252    ;AC
17436  100250  125252  125252                  .WORD   125252,125252
17437  100254  020300  000000  000000  2$:     .WORD   20300,0,0,0     ;FSRC
17438  100262  000000
17439  100264  000177  177777  177777  3$:     .WORD   177,-1,-1,-1    ;RES
17440  100272  177777
17441  100274  002200                  5$:     2200                    ;FPS BEFORE EXECUTION.
17442  100276  102204                          102204                  ;FPS AFTER EXECUTION.
17443  100300  000012                  6$:     12                      ;FEC
17444  100302  177777                          -1                      ;FLAG
17445
17446                                  ;UNDERFLOW, EXPONENT OF THE RESULT = -193
17447  100304  004737  100464          LLL2:   JSR     PC,@#OVUNDT
17448  100310  010327  127272          1$:     .WORD   10327,127272    ;AC
17449  100314  036363  045454                  .WORD   36363,45454
17450  100320  010000  000000  000000  2$:     .WORD   10000,0,0,0     ;FSRC
17451  100326  000000
17452  100330  060127  127272          3$:     .WORD   60127,127272    ;RES
17453  100334  036363  045454                  .WORD   36363,45454
17454  100340  007217                  5$:     7217                    ;FPS BEFORE EXECUTION.
17455  100342  107200                          107200                  ;FPS AFTER EXECUTION.
17456  100344  000012                  6$:     12                      ;FEC
17457  100346  177777                          -1                      ;FLAG
17458
17459                                  ;OVERFLOW, EXPONENT OF THE RESULT = 128
17460  100350  004737  100464          LLL3:   JSR     PC,@#OVUNDT
17461  100354  060252  125252          1$:     .WORD   60252,125252    ;AC
17462  100360  125252  125252                  .WORD   125252,125252   ;FSRC
17463  100364  160100  000000  000000  2$:     .WORD   160100,0,0,0    ;FSRC
17464  100372  000000
17465  100374  100177  177777  177777  3$:     .WORD   100177,-1,-1,-1 ;RES
17466  100402  177777
17467  100404  001200                  5$:     1200                    ;FPS BEFORE EXECUTION.
17468  100406  101216                          101216                  ;FPS AFTER EXECUTION.
17469  100410  000010                  6$:     10                      ;FEC
17470  100412  000000                          0                       ;FLAG
17471
17472                                  ;OVERFLOW, EXPONENT OF THE RESULT = 130
17473  100414  004737  100464          LLL4:   JSR     PC,@#OVUNDT
17474  100420  060345  067654          1$:     .WORD   60345,67654     ;AC
17475  100424  056765  045676                  .WORD   56765,45676
17476  100430  060200  000000  000000  2$:     .WORD   60200,0,0,0     ;FSRC
17477  100436  000000
17478  100440  000345  067654          3$:     .WORD   345,67654       ;RES
17479  100444  056765  045676                  .WORD   56765,45676
17480  100450  007215                  5$:     7215                    ;FPS BEFORE EXECUTION.
17481  100452  107202                          107202                  ;FPS AFTER EXECUTION.
17482  100454  000010                  6$:     10                      ;FEC
17483  100456  000000                          0                       ;FLAG
17484  100460  000137  100646          8$:     JMP     @#LLLDONE
17485
17486                                  ;THIS SUBROUTINE, OVUNDT, IS USED TO SET UP THE OPERANDS, EXECUTE
17487                                  ;THE MULD INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
17488                                  ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
17489                                  ;TO IT IS MADE THUS:
```

```
17490
17491                   ;
17492                   ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
17493                   ;               FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
17494                   ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
17495                   ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
                        ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
```

```
17496                                   ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
17497                                   ;               FEC:    .WORD   X               ;EXPECTED FEC
17498                                   ;               FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
17499                                   ;               ERR1:   ERROR   X               ;TRAP ERROR.
17500                                   ;               BR      CONT
17501                                   ;               ERR2:   ERROR   X               ;DATA, RESULT ERROR
17502                                   ;               CONT:                           ;RETURN ADDRESS
17503                                   ;
17504                                   ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
17505                                   ;THE MULD INSTRUCTION IS EXECUTED. IF THE TRAP OCCURS THEN THE
17506                                   ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
17507                                   ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNDT RETURNS CONTROL
17508                                   ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNDT
17509                                   ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. THE FEC IS TREATED
17510                                   ;IN THE SAME WAY. IF THE RESULT OF THE
17511                                   ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
17512                                   ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
17513                                   ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNDT
17514                                   ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
17515                                   ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNDT WILL
17516                                   ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
17517                                   ;IF NO TRAP OCCURS CONTROL IS PASSED TO ERR1.
17518                                   ;NOTE THAT OVUNDNT USES THE FLAG
17519                                   ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
17520                                   ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).
17521
17522  100464  012601                   OVUNDT: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
17523  100466  012700  000200                   MOV     #200,R0         ;SET FD MODE.
17524  100472  170100                           LDFPS   R0
17525
17526  100474  010100                           MOV     R1,R0           ;LOAD AC0, OPERAND.
17527  100476  172410                           LDD     (R0),AC0
17528  100500  016100  000030                   MOV     30(R1),R0       ;LOAD THE FPS.
17529  100504  170100                           LDFPS   R0
17530  100506  012737  100530  000244           MOV     #50$,@#FPVECT   ;SET UP THE FP TRAP VECTOR IN CASE
17531                                                                   ;OF ERROR.
17532  100514  010100                           MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
17533  100516  062700  000010                   ADD     #10,R0
17534
17535  100522  171010                   1$:     MULD    (R0),AC0        ;TEST INSTRUCTION. SHOULD CAUSE TRAP.
17536  100524  170000                   2$:     CFCC
17537  100526  104000                           EMT                     ;
17538  100530  011602                   50$:    MOV     (SP),R2         ;TRAP TO HERE AND SEE IF THE PC OF THE
17539  100532  020227  100524                   CMP     R2,#2$          ;TRAP WAS THAT OF THE MULF INSTRUCTION.
17540  100536  001401                           BEQ     51$             ;BRANCH IF YES.
17541  100540  104000                           EMT                     ;
17542  100542  022626                   51$:    CMP     (SP)+,(SP)+     ;RESET THE STACK
17543  100544  170204                           STFPS   R4              ;GET FPS.
17544  100546  170305                           STST    R5              ;GET FEC.
17545  100550  012700  000200                   MOV     #200,R0         ;SET FD MODE.
17546  100554  170100                           LDFPS   R0
17547  100556  012700  100636                   MOV     #OVDTT,R0       ;GET THE RESULT.
17548  100562  174010                           STD     AC0,(R0)
17549  100564  012700  100636                   MOV     #OVDTT,R0       ;CHECK THE RESULT.
17550  100570  010102                           MOV     R1,R2
17551  100572  062702  000020                   ADD     #20,R2
```

```
17552  100576  012703  000004          MOV     #4,R3
17553  100602  022022                  3$:     CMP     (R0)+,(R2)+
17554  100604  001401                          BEQ     5$
17555  100606  104000                          EMT                             ;
17556  100610  077304                  5$:     SOB     R3,3$
17557  100612  026104  000032                  CMP     32(R1),R4               ;WAS FPS CORRECT?
17558  100616  001401                          BEQ     6$
17559  100620  104000                          EMT                             ;
17560  100622  026105  000034          6$:     CMP     34(R1),R5               ;IS FEC CORRECT?
17561  100626  001401                          BEQ     4$
17562  100630  104000                          EMT                             ;
17563  100632  000161  000040          4$:     JMP     40(R1)                  ;RETURN, TEST COMPLETED.
17564
17565  100636  000000  000000  000000  OVDTT:  .WORD   0,0,0,0
17566  100644  000000
17567
17568  100646                          LLLDONE:
17569  100646  004767  023720                  JSR     PC,.RSET                ;GO INITIALIZE THE FPS AND STACK; AND
17570                                                                          ;SEE IF THE USER HAS EXPRESSED
17571                                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
17572                                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
17573                                                                          ;THE USER TYPED CONTROL G?).
17574
17575
17576
17577
17578
17579                                   ;*****************************************************************************
17580                                   ;TEST 505       MODF TEST
17581                                   ;*****************************************************************************
17582  100652                          TS505:
17583
17584                                   ;MODF WITH (FSRC=AC=0)
17585  100652  004737  101376          GGG1:   JSR     PC,@#MODFSUB
17586  100656  000000  000000          1$:     .WORD   0,0                     ;AC
17587  100662  000000  000000          2$:     .WORD   0,0                     ;FSRC
17588  100666  000000  000000          3$:     .WORD   0,0                     ;FRACTIONAL RES.
17589  100672  000000  000000          4$:     .WORD   0,0                     ;INTEGER RES.
17590  100676  000013                  7$:     13                              ;FPS BEFORE EXECUTION.
17591  100700  000004                          4                               ;FPS AFTER EXECUTION.
17592
17593                                   ;MODF TEST, WITH (FSRC=0)
17594  100702  004737  101376          GGG2:   JSR     PC,@#MODFSUB
17595  100706  123456  076543          1$:     .WORD   123456,76543            ;AC
17596  100712  000000  000000          2$:     .WORD   0,0                     ;FSRC
17597  100716  000000  000000          3$:     .WORD   0,0                     ;FRACTIONAL RES.
17598  100722  000000  000000          4$:     .WORD   0,0                     ;INTEGER RESULT.
17599  100726  000000                  7$:     0                               ;FPS BEFORE EXECUTION.
17600  100730  000004                          4                               ;FPS AFTER EXECUTION.
17601
17602                                   ;MODF TEST WITH (AC=0)
17603  100732  004737  101376          GGG3:   JSR     PC,@#MODFSUB
17604  100736  000000  000000          1$:     .WORD   0,0                     ;AC
17605  100742  076543  021234          2$:     .WORD   76543,21234             ;FSRC
17606  100746  000000  000000          3$:     .WORD   0,0                     ;FRACTIONAL RES.
17607  100752  000000  000000          4$:     .WORD   0,0                     ;INTEGER RES.
```

```
17608  100756  000003                  7$:     3                       ;FPS BEFORE EXECUTION.
17609  100760  000004                          4                       ;FPS AFTER EXECUTION.
17610
17611                                  ;MODF TEST WITH EXPONENT OF THE RESULT = 25
17612  100762  004737  101376          GGG4:   JSR     PC,@#MODFSUB
17613  100766  046252  125252          1$:     .WORD   46252,125252    ;AC
17614  100772  040300  000000          2$:     .WORD   40300,0         ;FSRC
17615  100776  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
17616  101002  046377  177777          4$:     .WORD   46377,-1        ;INTEGER RES.
17617  101006  000013                  7$:     13                      ;FPS BEFORE EXECUTION.
17618  101010  000004                          4                       ;FPS AFTER EXECUTION.
17619
17620                                  ;MODF TEST WITH EXPONENT OF THE RESULT = 127
17621  101012  004737  101376          GGG5:   JSR     PC,@#MODFSUB
17622  101016  077652  125252          1$:     .WORD   77652,125252    ;AC
17623  101022  040300  000000          2$:     .WORD   40300,0         ;FSRC
17624  101026  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
17625  101032  077777  177777          4$:     .WORD   77777,-1        ;INTEGER RES.
17626  101036  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
17627  101040  000004                          4                       ;FPS AFTER EXECUTION.
17628
17629                                  ;MODF TEST WITH EXPONENT OF RESULT = 25
17630  101042  004737  101376          GGG6:   JSR     PC,@#MODFSUB
17631  101046  046200  000001          1$:     .WORD   46200,1         ;AC
17632  101052  040340  000000          2$:     .WORD   40340,0         ;FSRC
17633  101056  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
17634  101062  046340  000001          4$:     .WORD   46340,1         ;INTEGER RES.
17635  101066  000013                  7$:     13                      ;FPS BEFORE EXECUTION.
17636  101070  000004                          4                       ;FPS AFTER EXECUTION.
17637
17638                                  ;MODF   TEST WITH EXPONENT OF THE RESULT = 24
17639  101072  004737  101376          GGG7:   JSR     PC,@#MODFSUB
17640  101076  046000  000001          1$:     .WORD   46000,1         ;AC
17641  101102  040340  000000          2$:     .WORD   40340,0         ;FSRC
17642  101106  040100  000000          3$:     .WORD   40100,0         ;FRACTIONAL RES.
17643  101112  046140  000001          4$:     .WORD   46140,1         ;INTEGER RESULT.
17644  101116  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
17645  101120  000000                          0                       ;FPS AFTER EXECUTION.
17646
17647                                  ;MODF TEST WITH EXPONENT OF THE RESULT = 10
17648  101122  004737  101376          GGG8:   JSR     PC,@#MODFSUB
17649  101126  042577  177777          1$:     .WORD   42577,-1        ;AC
17650  101132  040200  000000          2$:     .WORD   40200,0         ;FSRC
17651  101136  040177  176000          3$:     .WORD   40177,176000    ;FRACTIONAL RES.
17652  101142  042577  140000          4$:     .WORD   42577,140000    ;INTEGER RES.
17653  101146  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
17654  101150  000000                          0                       ;FPS AFTER EXECUTION.
17655
17656                                  ;MODF TEST WITH THE EXPONENT OF THE RESULT = 10
17657  101152  004737  101376          GGG9:   JSR     PC,@#MODFSUB
17658  101156  042577  140001          1$:     .WORD   42577,140001    ;AC
17659  101162  040200  000000          2$:     .WORD   40200,0         ;FSRC
17660  101166  034600  000000          3$:     .WORD   34600,0         ;FRACTIONAL RES.
17661  101172  042577  140000          4$:     .WORD   42577,140000    ;INTEGER RES.
17662  101176  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
17663  101200  000000                          0                       ;FPS AFTER EXECUTION.
```

```
17664
17665
17666  101202  004737  101376          ;MODF TEST WITH EXPONENT OF THE RESULT = 9
17667  101206  042377  100000  GGG10:  JSR     PC,@#MODFSUB
17668  101212  040200  000000  1$:     .WORD   42377,100000    ;AC
17669  101216  000000  000000  2$:     .WORD   40200,0         ;FSRC
17670  101222  042377  100000  3$:     .WORD   0,0             ;FRACTIONAL RES.
17671  101226  000013          4$:     .WORD   42377,100000    ;INTEGER RES.
17672  101230  000004          7$:     13                      ;FPS BEFORE EXECUTION.
17673                                  4                       ;FPS AFTER EXECUTION.
17674
17675  101232  004737  101376          ;MODF TEST WITH EXPONENT OF THE RESULT = 0
17676  101236  040177  177777  GGG11:  JSR     PC,@#MODFSUB
17677  101242  040200  000000  1$:     .WORD   40177,-1        ;AC
17678  101246  040177  177777  2$:     .WORD   40200,0         ;FSRC
17679  101252  000000  000000  3$:     .WORD   40177,-1        ;FRACTIONAL RES.
17680  101256  000017          4$:     .WORD   0,0             ;INTEGER RES.
17681  101260  000000          7$:     17                      ;FPS BEFORE EXECUTION.
17682                                  0                       ;FPS AFTER EXECUTION.
17683
17684  101262  004737  101376          ;MODF TEST WITH EXPONENT OF THE RESULT = -15
17685  101266  034377  177777  GGG12:  JSR     PC,@#MODFSUB
17686  101272  040200  000000  1$:     .WORD   34377,-1        ;AC
17687  101276  034377  177777  2$:     .WORD   40200,0         ;FSRC
17688  101302  000000  000000  3$:     .WORD   34377,-1        ;FRACTIONAL RES.
17689  101306  000000          4$:     .WORD   0,0             ;INTEGER RES.
17690  101310  000000          7$:     0                       ;FPS BEFORE EXECUTION.
17691                                  0                       ;FPS AFTER EXECUTION.
17692
17693  101312  004737  101376          ;MODF TEST WITH EXPONENT OF RESULT = -64, IN ROUND MODE
17694  101316  020000  000001  GGG13:  JSR     PC,@#MODFSUB
17695  101322  040300  000000  1$:     .WORD   20000,1         ;AC
17696  101326  020100  000002  2$:     .WORD   40300,0         ;FSRC
17697  101332  000000  000000  3$:     .WORD   20100,2         ;FRACTIONAL RES.
17698  101336  000000          4$:     .WORD   0,0             ;INTEGER RES.
17699  101340  000000          7$:     0                       ;FPS BEFORE EXECUTION.
17700                                  0                       ;FPS AFTER EXECUTION.
17701
17702  101342  004737  101376          ;MODF TEST WITH EXPONENT OF RESULT = 11
17703  101346  142777  170000  GGG14:  JSR     PC,@#MODFSUB
17704  101352  040200  000000  1$:     .WORD   142777,170000   ;AC
17705  101356  140000  000000  2$:     .WORD   40200,0         ;FSRC
17706  101362  142777  160000  3$:     .WORD   140000,0        ;FRACTIONAL RES.
17707  101366  000007          4$:     .WORD   142777,160000   ;INTEGER RES.
17708  101370  000010          7$:     7                       ;FPS BEFORE EXECUTION.
17709  101372  000167  000204          10                      ;FPS AFTER EXECUTION.
17710                          9$:     JMP     GGGDONE         ;GO TO NEXT TEST.
17711
17712                          ;THIS SUBROUTINE, MODFSUB, IS CALLED TO SETUP THE
17713                          ;OPERANDS, EXECUTE THE MODF INSTRUCTION AND CHECK THE RESULTS.
17714                          ;IT IS CALLED THUS:
17715                          ;
17716                          ;               ACARG:  .WORD   X,X             ;AC OPERAND
17717                          ;               FSRCARG:.WORD   X,X             ;FSRC OPERAND
17718                          ;               FRES:   .WORD   X,X             ;FRACTIONAL RESULT
17719                          ;               INTRES: .WORD   X,X             ;INTEGER RESULT
```

```
17720                                   ;               ERFRES: .WORD   X,X             ;ERROR FRACTION RESULT
17721                                   ;               ERINTRES:.WORD  X,X             ;ERROR INTEGER RESULT
17722                                   ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
17723                                   ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
17724                                   ;               ERR1:   ERROR   X               ;FRACTION ERROR
17725                                   ;                       BR      CONT
17726                                   ;               ERR2:   ERROR   X               ;INTEGER ERROR
17727                                   ;               CONT:                           ;RETURN ADDRESS
17728                                   ;
17729                                   ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODF
17730                                   ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
17731                                   ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
17732                                   ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
17733                                   ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
17734                                   ;THEN MODFSUB WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
17735                                   ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
17736                                   ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
17737                                   ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
17738                                   ;FAILURE MATCHES THE TRUE RESULT THEN  MODFSUB PASSES CONTROL TO THE
17739                                   ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
17740                                   ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
17741                                   ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
17742                                   ;IF A MATCH IS MADE HOWEVER, MODFSUB WILL RETURN CONTROL TO THE ERROR
17743                                   ;CALL AT ERR2.
17744
17745  101376  012601                   MODFSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
17746  101400  012700  000200                   MOV     #200,R0         ;SET FD MODE.
17747  101404  170100                   LDFPS   R0
17748  101406  010100                   MOV     R1,R0           ;SET UP AC0
17749  101410  172410                   LDD     (R0),AC0
17750  101412  012700  101572           MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
17751  101416  172510                   LDD     (R0),AC1
17752  101420  016100  000020           MOV     20(R1),R0       ;SET UP THE FPS.
17753  101424  170100                   LDFPS   R0
17754  101426  010100                   MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
17755  101430  062700  000004           ADD     #4,R0
17756
17757  101434  171410           1$:     MODF    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
17758
17759  101436  170204                   STFPS   R4              ;GET THE FPS.
17760  101440  012700  000200           MOV     #200,R0         ;SET FD MODE.
17761  101444  170100                   LDFPS   R0
17762  101446  012700  101552           MOV     #MODFT0,R0      ;GET THE FRACTIONAL RESULT.
17763  101452  174010                   STD     AC0,(R0)
17764  101454  012700  101562           MOV     #MODFT1,R0      ;GET THE INTEGER RESULT.
17765  101460  174110                   STD     AC1,(R0)
17766  101462  012702  101552           MOV     #MODFT0,R2      ;CHECK THE FRACTIONAL RESULT.
17767  101466  026112  000010           CMP     10(R1),(R2)
17768  101472  001401                   BEQ     2$
17769  101474  104000                   EMT                     ;
17770  101476  026162  000012  000002   2$:     CMP     12(R1),2(R2)
17771  101504  001401                   BEQ     3$
17772  101506  104000                   EMT                     ;
17773  101510  012702  101562           3$:     MOV     #MODFT1,R2      ;CHECK THE INTEGER RESULT.
17774  101514  026112  000014           CMP     14(R1),(R2)
17775  101520  001401                   BEQ     4$
```

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17776  101522  104000                          EMT                     ;
17777  101524  026162  000016  000002  4$:     CMP     16(R1),2(R2)
17778  101532  001401                          BEQ     5$
17779  101534  104000                          EMT                     ;
17780  101536  026104  000022          5$:     CMP     22(R1),R4       ;CHECK THE FPS.
17781  101542  001401                          BEQ     9$
17782  101544  104000                          EMT                     ;
17783  101546  000161  000024          9$:     JMP     24(R1)          ;RETURN.
17784
17785  101552  000000  000000  000000  MODFT0: .WORD   0,0,0,0
17786  101560  000000
17787
17788  101562  000000  000000  000000  MODFT1: .WORD   0,0,0,0
17789  101570  000000
17790
17791  101572  177777  177777  177777  MODP1:  .WORD   -1,-1,-1,-1
17792  101600  177777
17793
17794  101602                          GGGDONE:
17795  101602  004767  022764                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
17796                                                                  ;SEE IF THE USER HAS EXPRESSED
17797                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
17798                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
17799                                                                  ;THE USER TYPED CONTROL G?).
17800
17801
17802
17803
17804                                   ;*****************************************************************************************
17805                                   ;TEST 506       MODD TEST
17806                                   ;*****************************************************************************************
17807  101606                          TS506:
17808
17809                                   ;MODD WITH (FSRC=AC=0)
17810  101606  004737  102622          HHH1:   JSR     PC,@#MODDSUB
17811  101612  000000  000000  000000  1$:     .WORD   0,0,0,0         ;AC
17812  101620  000000
17813  101622  000000  000000  000000  2$:     .WORD   0,0,0,0         ;FSRC
17814  101630  000000
17815  101632  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
17816  101640  000000
17817  101642  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
17818  101650  000000
17819  101652  000200                  7$:     200                     ;FPS BEFORE EXECUTION.
17820  101654  000204                          204                     ;FPS AFTER EXECUTION.
17821
17822                                   ;MODD TEST WITH FSRC=0
17823  101656  004737  102622          HHH2:   JSR     PC,@#MODDSUB
17824  101662  012345  067012          1$:     .WORD   012345,67012    ;AC
17825  101666  034567  012345                  .WORD   34567,012345
17826  101672  000000  000000  000000  2$:     .WORD   0,0,0,0         ;FSRC
17827  101700  000000
17828  101702  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
17829  101710  000000
17830  101712  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
17831  101720  000000
```

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17832  101722  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
17833  101724  000204                          204                     ;FPS AFTER EXECUTION.
17834
17835                                  ;MODD TEST WITH (AC=0)
17836  101726  004737  102622          HHH3:   JSR     PC,@#MODDSUB
17837  101732  000000  000000  000000  1$:     .WORD   0,0,0,0         ;AC
17838  101740  000000
17839  101742  072727  127272          2$:     .WORD   72727,127272    ;FSRC
17840  101746  072727  127272                  .WORD   72727,127272
17841  101752  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
17842  101760  000000
17843  101762  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
17844  101770  000000
17845  101772  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
17846  101774  000204                          204                     ;FPS AFTER EXECUTION.
17847
17848                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 57
17849  101776  004737  102622          HHH4:   JSR     PC,@#MODDSUB
17850  102002  056252  125252          1$:     .WORD   56252,125252    ;AC
17851  102006  125252  125250                  .WORD   125252,125250
17852  102012  040300  000000  000000  2$:     .WORD   40300,0,0,0     ;FSRC
17853  102020  000000
17854  102022  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
17855  102030  000000
17856  102032  056377  177777  177777  4$:     .WORD   56377,-1,-1,-4  ;INTEGER RES.
17857  102040  177774
17858  102042  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
17859  102044  000204                          204                     ;FPS AFTER EXECUTION.
17860
17861                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 79
17862  102046  004737  102622          HHH5:   JSR     PC,@#MODDSUB
17863  102052  140240  000000  000000  1$:     .WORD   140240,0,0,0    ;AC
17864  102060  000000
17865  102062  063714  146314          2$:     .WORD   63714,146314    ;FSRC
17866  102066  133572  167737                  .WORD   133572,167737
17867  102072  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
17868  102100  000000
17869  102102  163777  177777          4$:     .WORD   163777,-1       ;INTEGER RES.
17870  102106  162531  125726                  .WORD   162531,125726
17871  102112  000210                  7$:     210                     ;FPS BEFORE EXECUTION.
17872  102114  000204                          204                     ;FPS AFTER EXECUTION.
17873
17874                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 57
17875  102116  004737  102622          HHH6:   JSR     PC,@#MODDSUB
17876  102122  056200  000000  000000  1$:     .WORD   56200,0,0,1     ;AC
17877  102130  000001
17878  102132  040340  000000  000000  2$:     .WORD   40340,0,0,0     ;FSRC
17879  102140  000000
17880  102142  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
17881  102150  000000
17882  102152  056340  000000  000000  4$:     .WORD   56340,0,0,1     ;INTEGER RES.
17883  102160  000001
17884  102162  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
17885  102164  000204                          204                     ;FPS AFTER EXECUTION.
17886
17887                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 56
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17888  102166  004737  102622          HHH7:   JSR     PC,@#MODDSUB
17889  102172  056000  000000  000000  1$:     .WORD   56000,0,0,1     ;AC
17890  102200  000001
17891  102202  040340  000000  000000  2$:     .WORD   40340,0,0,0     ;FSRC
17892  102210  000000
17893  102212  040100  000000  000000  3$:     .WORD   40100,0,0,0     ;FRACTIONAL RES.
17894  102220  000000
17895  102222  056140  000000  000000  4$:     .WORD   56140,0,0,1     ;INTEGER RES.
17896  102230  000001
17897  102232  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
17898  102234  000200                          200                     ;FPS AFTER EXECUTION.
17899
17900                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 36
17901  102236  004737  102622          HHH8:   JSR     PC,@#MODDSUB
17902  102242  051177  177777  177777  1$:     .WORD   51177,-1,-1,-1  ;AC
17903  102250  177777
17904  102252  040200  000000  000000  2$:     .WORD   40200,0,0,0     ;FSRC
17905  102260  000000
17906  102262  040177  177760  000000  3$:     .WORD   40177,-20,0,0   ;FRACTIONAL RES.
17907  102270  000000
17908  102272  051177  177777  177760  4$:     .WORD   51177,-1,-20,0  ;INTEGER RES.
17909  102300  000000
17910  102302  000217                  7$:     217                     ;FPS BEFORE EXECUTION.
17911  102304  000200                          200                     ;FPS AFTER EXECUTION.
17912
17913                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 30
17914  102306  004737  102622          HHH9:   JSR     PC,@#MODDSUB
17915  102312  040200  000000  000000  1$:     .WORD   40200,0,0,0     ;AC
17916  102320  000000
17917  102322  047577  177777          2$:     .WORD   47577,-1        ;FSRC
17918  102326  176000  000001                  .WORD   176000,1
17919  102332  031600  000000  000000  3$:     .WORD   31600,0,0,0     ;FRACTIONAL RES.
17920  102340  000000
17921  102342  047577  177777          4$:     .WORD   47577,-1        ;INTEGER RES.
17922  102346  176000  000000                  .WORD   176000,0
17923  102352  000200                  7$:     200                     ;FPS BEFORE EXECUTION.
17924  102354  000200                          200                     ;FPS AFTER EXECUTION.
17925
17926                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 31
17927  102356  004737  102622          HHH10:  JSR     PC,@#MODDSUB
17928  102362  047777  177777          1$:     .WORD   47777,-1        ;AC
17929  102366  177000  000000                  .WORD   177000,0
17930  102372  040200  000000  000000  2$:     .WORD   40200,0,0,0     ;FSRC
17931  102400  000000
17932  102402  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
17933  102410  000000
17934  102412  047777  177777          4$:     .WORD   47777,-1        ;INTEGER RES.
17935  102416  177000  000000                  .WORD   177000,0
17936  102422  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
17937  102424  000204                          204                     ;FPS AFTER EXECUTION.
17938
17939                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 0
17940  102426  004737  102622          HHH11:  JSR     PC,@#MODDSUB
17941  102432  040200  000000  000000  1$:     .WORD   40200,0,0,0     ;AC
17942  102440  000000
17943  102442  040177  072727          2$:     .WORD   40177,72727     ;FSRC
```

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17944  102446  127272  072727                  .WORD   127272,72727
17945  102452  040177  072727          3$:     .WORD   40177,72727     ;FRACTIONAL RES.
17946  102456  127272  072727                  .WORD   127272,72727
17947  102462  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
17948  102470  000000
17949  102472  000200                  7$:     200                     ;FPS BEFORE EXECUTION.
17950  102474  000200                          200                     ;FPS AFTER EXECUTION.
17951
17952                                  ;MODD TEST WITH EXPONENT OF THE RESULT = -115
17953  102476  004737  102622          HHH12:  JSR     PC,@#MODDSUB
17954  102502  003377  177777          1$:     .WORD   3377,-1         ;AC
17955  102506  177777  052525                  .WORD   -1,52525
17956  102512  040200  000000  000000  2$:     .WORD   40200,0,0,0     ;FSRC
17957  102520  000000
17958  102522  003377  177777          3$:     .WORD   3377,-1         ;FRACTIONAL RES.
17959  102526  177777  052525                  .WORD   -1,52525
17960  102532  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
17961  102540  000000
17962  102542  000200                  7$:     200                     ;FPS BEFORE EXECUTION.
17963  102544  000200                          200                     ;FPS AFTER EXECUTION.
17964
17965                                  ;MODD TEST WITH EXPONENT OF THE RESULT = -63, IN ROUND MODE.
17966  102546  004737  102622          HHH13:  JSR     PC,@#MODDSUB
17967  102552  040300  000000  000000  1$:     .WORD   40300,0,0,0     ;AC
17968  102560  000000
17969  102562  020200  000000  000000  2$:     .WORD   20200,0,0,1     ;FSRC
17970  102570  000001
17971  102572  020300  000000  000000  3$:     .WORD   20300,0,0,2     ;FRACTIONAL RES.
17972  102600  000002
17973  102602  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
17974  102610  000000
17975  102612  000200                  7$:     200                     ;FPS BEFORE EXECUTION.
17976  102614  000200                          200                     ;FPS AFTER EXECUTION.
17977  102616  000137  103016          9$:     JMP     @#HHHDONE       ;GO TO THE NEXT TEST.
17978
17979                                  ;THIS SUBROUTINE, MODDSUB, IS CALLED TO SETUP THE
17980                                  ;OPERANDS, EXECUTE THE MODD INSTRUCTION AND CHECK THE RESULTS.
17981                                  ;IT IS CALLED THUS:
17982                                  ;
17983                                  ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
17984                                  ;               FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
17985                                  ;               FRES:   .WORD   X,X,X,X         ;FRACTIONAL RESULT
17986                                  ;               INTRES: .WORD   X,X,X,X         ;INTEGER RESULT
17987                                  ;               ERFRES: .WORD   X,X,X,X         ;ERROR FRACTION RESULT
17988                                  ;               ERINTRES:.WORD  X,X,X,X         ;ERROR INTEGER RESULT
17989                                  ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
17990                                  ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
17991                                  ;               ERR1:   ERROR   X               ;FRACTION ERROR
17992                                  ;                       BR      CONT
17993                                  ;               ERR2:   ERROR   X               ;INTEGER ERROR
17994                                  ;               CONT:                           ;RETURN ADDRESS
17995                                  ;
17996                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODD
17997                                  ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
17998                                  ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
17999                                  ;THEN THE INTEGER PART IS COMPARED WITH .NTRES. IF BOTH OF THESE ARE CORRECT
```

```
18000                                   ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
18001                                   ;THEN MODDSUB WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
18002                                   ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
18003                                   ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
18004                                   ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
18005                                   ;FAILURE MATCHES THE TRUE RESULT THEN  MODDSUB PASSES CONTROL TO THE
18006                                   ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
18007                                   ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
18008                                   ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
18009                                   ;IF A MATCH IS MADE HOWEVER, MODDSUB WILL RETURN CONTROL TO THE ERROR
18010                                   ;CALL AT ERR2.
18011
18012  102622  012601                  MODDSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
18013  102624  012700  000200                  MOV     #200,R0         ;SET FD MODE.
18014  102630  170100                          LDFPS   R0
18015  102632  010100                          MOV     R1,R0           ;SET UP AC0
18016  102634  172410                          LDD     (R0),AC0
18017  102636  012700  101572                  MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
18018  102642  172510                          LDD     (R0),AC1
18019  102644  016100  000040                  MOV     40(R1),R0       ;SET UP THE FPS.
18020  102650  170100                          LDFPS   R0
18021  102652  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
18022  102654  062700  000010                  ADD     #10,R0
18023
18024  102660  171410                  1$:     MODD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
18025
18026  102662  170204                          STFPS   R4              ;GET THE FPS.
18027  102664  012700  000200                  MOV     #200,R0         ;SET FD MODE.
18028  102670  170100                          LDFPS   R0
18029  102672  012700  102776                  MOV     #MODDT0,R0      ;GET THE FRACTIONAL RESULT.
18030  102676  174010                          STD     AC0,(R0)
18031  102700  012700  103006                  MOV     #MODDT1,R0      ;GET THE INTEGER RESULT.
18032  102704  174110                          STD     AC1,(R0)
18033  102706  012702  102776                  MOV     #MODDT0,R2      ;CHECK THE FRACTIONAL RESULT.
18034  102712  010103                          MOV     R1,R3
18035  102714  062703  000020                  ADD     #20,R3
18036  102720  012705  000004                  MOV     #4,R5
18037  102724  022223                  2$:     CMP     (R2)+,(R3)+
18038  102726  001401                          BEQ     4$
18039  102730  104000                          EMT                     ;
18040  102732  077504                  4$:     SOB     R5,2$
18041  102734  012702  103006                  MOV     #MODDT1,R2      ;CHECK THE INTEGER RESULT.
18042  102740  010103                          MOV     R1,R3
18043  102742  062703  000030                  ADD     #30,R3
18044  102746  012705  000004                  MOV     #4,R5
18045  102752  022223                  3$:     CMP     (R2)+,(R3)+
18046  102754  001401                          BEQ     5$
18047  102756  104000                          EMT                     ;
18048  102760  077504                  5$:     SOB     R5,3$
18049  102762  026104  000042                  CMP     42(R1),R4       ;CHECK THE FPS.
18050  102766  001401                          BEQ     9$
18051  102770  104000                          EMT                     ;
18052  102772  000161  000044          9$:     JMP     44(R1)          ;RETURN.
18053
18054  102776  000000  000000  000000  MODDT0: .WORD   0,0,0,0
18055  103004  000000
```

```
18056
18057  103006  000000  000000  000000  MODDT1: .WORD   0,0,0,0
18058  103014  000000
18059
18060  103016                          HHHDONE:
18061  103016  004767  021550                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18062                                                                  ;SEE IF THE USER HAS EXPRESSED
18063                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
18064                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18065                                                                  ;THE USER TYPED CONTROL G?).
18066
18067
18068
18069
18070                                  ;*****************************************************************************
18071                                  ;TEST 507       UNDER\OVER FLOW, USING MODF WITH TRAPS DISABLED, TEST
18072                                  ;*****************************************************************************
18073  103022                          TS507:
18074
18075                                  ;UNDERFLOW TEST, WITH EXPONENT OF THE RESULT = -129, FIU = 1, FID = 1
18076  103022  004767  000214          MMM1:   JSR     PC,MODFOV
18077  103026  020123  045676          1$:     .WORD   20123,45676     ;AC
18078  103032  020200  000000          2$:     .WORD   20200,0         ;FSRC
18079  103036  000123  045676          3$:     .WORD   123,45676       ;FRACTIONAL RES.
18080  103042  000000  000000          4$:     .WORD   0,0             ;INTEGER RES.
18081  103046  042000                  7$:     42000                   ;FPS BEFORE EXECUTION.
18082  103050  142004                          142004                  ;FPS AFTER EXECUTION.
18083  103052  000012                          12                      ;FEC
18084  103054  104000                          EMT                     ;
18085
18086                                  ;UNDERFLOW EXP OF RESULT = -193, FIU = 0, FID = 1
18087  103056  004737  103242          MMM2:   JSR     PC,@#MODFOV
18088  103062  010200  000000          1$:     .WORD   10200,0         ;AC
18089  103066  010000  000000          2$:     .WORD   10000,0         ;FSRC
18090  103072  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
18091  103076  000000  000000          4$:     .WORD   0,0             ;INTEGER RES.
18092  103102  005013                  7$:     5013                    ;FPS BEFORE EXECUTION.
18093  103104  005004                          5004                    ;FPS AFTER EXECUTION.
18094  103106  000012                          12                      ;FEC
18095  103110  000240                          NOP
18096
18097                                  ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, FIV = 1, FID = 1
18098  103112  004737  103242          MMM3:   JSR     PC,@#MODFOV
18099  103116  060052  125252          1$:     .WORD   60052,125252    ;AC
18100  103122  060200  000000          2$:     .WORD   60200,0         ;FSRC
18101  103126  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
18102  103132  000052  125252          4$:     .WORD   52,125252       ;INTEGER RES.
18103  103136  041000                  7$:     41000                   ;FPS BEFORE EXECUTION.
18104  103140  141006                          141006                  ;FPS AFTER EXECUTION.
18105  103142  000010                          10                      ;FEC
18106  103144                          8$:
18107  103144  104000                          EMT                     ;
18108                                  ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 130, FIV = 0, FID = 1
18109  103146  004737  103242          MMM4:   JSR     PC,@#MODFOV
18110  103152  060345  067654          1$:     .WORD   60345,67654     ;AC
18111  103156  060200  000000          2$:     .WORD   60200,0         ;FSRC
```

```
18112  103162  000000  000000  3$:     .WORD   0,0             ;FRACTIONAL RES.
18113  103166  000000  000000  4$:     .WORD   0,0             ;INTEGER RES.
18114  103172  006011          7$:     6011                    ;FPS BEFORE EXECUTION.
18115  103174  006006                  6006                    ;FPS AFTER EXECUTION.
18116  103176  000010                  10                      ;FEC
18117  103200  000240          8$:     NOP
18118                          ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, RESULT NEGATIVE
18119                          ;AND FIV = 1, FID = 1
18120  103202  004737  103242  MMM5:   JSR     PC,@#MODFOV
18121  103206  160252  125252  1$:     .WORD   160252,125252   ;AC
18122  103212  060000  000000  2$:     .WORD   60000,0         ;FSRC
18123  103216  000000  000000  3$:     .WORD   0,0             ;FRACTIONAL RES.
18124  103222  100052  125252  4$:     .WORD   100052,125252   ;INTEGER RES.
18125  103226  041000          7$:     41000                   ;FPS BEFORE EXECUTION.
18126  103230  141006                  141006                  ;FPS AFTER EXECUTION.
18127  103232  000010                  10                      ;FEC
18128  103234                  8$:
18129  103234  104000                  EMT                     ;
18130  103236  000137  103456  9$:     JMP     @#MMMDONE       ;GO TO THE NEXT TEST.
18131
18132                          ;THIS SUBROUTINE, MODFOV, IS CALLED TO SETUP THE
18133                          ;OPERANDS, EXECUTE THE MODF INSTRUCTION AND CHECK THE RESULTS.
18134                          ;IT IS CALLED THUS:
18135                          ;
18136                          ;               ACARG:  .WORD   X,X             ;AC OPERAND
18137                          ;               FSRCARG:.WORD   X,X             ;FSRC OPERAND
18138                          ;               FRES:   .WORD   X,X             ;FRACTIONAL RESULT
18139                          ;               INTRES: .WORD   X,X             ;INTEGER RESULT
18140                          ;               ERFRES: .WORD   X,X             ;ERROR FRACTION RESULT
18141                          ;               ERINTRES:.WORD  X,X             ;ERROR INTEGER RESULT
18142                          ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
18143                          ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
18144                          ;               FEC:    .WORD   X               ;FEC
18145                          ;               ERR1:   ERROR   X               ;FEC ERROR
18146                          ;                       BR      CONT
18147                          ;               ERR2:   ERROR   X               ;INTEGER ERROR
18148                          ;               CONT:                           ;RETURN ADDRESS
18149                          ;
18150                          ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODF
18151                          ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
18152                          ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
18153                          ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
18154                          ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
18155                          ;THEN MODFOV WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
18156                          ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
18157                          ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
18158                          ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
18159                          ;FAILURE MATCHES THE TRUE RESULT THEN  MODFOV PASSES CONTROL TO THE
18160                          ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
18161                          ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
18162                          ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
18163                          ;IF A MATCH IS MADE HOWEVER, MODFOV WILL RETURN CONTROL TO THE ERROR
18164                          ;CALL AT ERR2.
18165
18166  103242  012601          MODFOV: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
18167  103244' 012700  000200          MOV     #200,R0         ;SET FD MODE.
```

```
18168  103250  170100                          LDFPS   R0
18169  103252  010100                          MOV     R1,R0           ;SET UP AC0
18170  103254  172410                          LDD     (R0),AC0
18171  103256  012700  101572                 MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
18172  103262  172510                          LDD     (R0),AC1
18173  103264  016100  000020                 MOV     20(R1),R0       ;SET UP THE FPS.
18174  103270  170100                          LDFPS   R0
18175  103272  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
18176  103274  062700  000004                 ADD     #4,R0
18177
18178  103300  171410                  1$.     MODF    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
18179
18180  103302  170204                          STFPS   R4              ;GET THE FPS.
18181  103304  170305                          STST    R5              ;GET FEC.
18182  103306  012700  000200                 MOV     #200,R0         ;SET FD MODE.
18183  103312  170100                          LDFPS   R0
18184  103314  012700  103436                 MOV     #MODFD0,R0      ;GET THE FRACTIONAL RESULT.
18185  103320  174010                          STD     AC0,(R0)
18186  103322  012700  103446                 MOV     #MODFD1,R0      ;GET THE INTEGER RESULT.
18187  103326  174110                          STD     AC1,(R0)
18188  103330  012702  103436                 MOV     #MODFD0,R2      ;CHECK THE FRACTIONAL RESULT.
18189  103334  026112  000010                 CMP     10(R1),(R2)
18190  103340  001401                          BEQ     2$
18191  103342  104000                          EMT                     ;
18192  103344  026162  000012  000002  2$:     CMP     12(R1),2(R2)
18193  103352  001401                          BEQ     3$
18194  103354  104000                          EMT                     ;
18195  103356  012702  103446          3$:     MOV     #MODFD1,R2      ;CHECK THE INTEGER RESULT.
18196  103362  026112  000014                 CMP     14(R1),(R2)
18197  103366  001401                          BEQ     4$
18198  103370  104000                          EMT                     ;
18199  103372  026162  000016  000002  4$:     CMP     16(R1),2(R2)
18200  103400  001401                          BEQ     5$
18201  103402  104000                          EMT                     ;
18202  103404  026104  000022          5$:     CMP     22(R1),R4       ;CHECK THE FPS.
18203  103410  001401                          BEQ     6$
18204  103412  104000                          EMT                     ;
18205  103414  026105  000024          6$:     CMP     24(R1),R5       ;CHECK THE FEC.
18206  103420  001002                          BNE     25$             ;BRANCH IF INCORRECT.
18207
18208  103422  000161  000030          9$:     JMP     30(R1)          ;RETURN.
18209                                  ;REPORT FEC ERROR.
18210  103426  010102                  25$:    MOV     R1,R2
18211  103430  062702  000026                  ADD     #26,R2
18212  103434  000112                          JMP     (R2)
18213
18214  103436  000000  000000  000000  MODFD0: .WORD   0,0,0,0
18215  103444  000000
18216
18217  103446  000000  000000  000000  MODFD1: .WORD   0,0,0,0
18218  103454  000000
18219
18220  103456                          MMMDONE:
18221  103456  004767  021110                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18222                                                                  ;SEE IF THE USER HAS EXPRESSED
18223                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
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18224                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18225                                                   ;THE USER TYPED CONTROL G?).
18226
18227
18228
18229
18230                                   ;*****************************************************************************
18231                                   ;TEST 510       UNDER\OVER FLOW, USING MODD WITH TRAPS DISABLED, TEST
18232                                   ;*****************************************************************************
18233  103462                           TS510:
18234
18235                                   ;UNDERFLOW TEST WITH EXPONENT OF THE RESULT = -129, FIU = 1, FID = 1
18236  103462  004737  103746           NNN1:   JSR     PC,@#MODDOV
18237  103466  020252  125252           1$:     .WORD   20252,125252    ;AC
18238  103472  125252  125252                   .WORD   125252,125252
18239  103476  020100  000000  000000   2$:     .WORD   20100,0,0,0     ;FSRC
18240  103504  000000
18241  103506  000177  177777  177777   3$:     .WORD   177,-1,-1,-1    ;FRACTIONAL RES.
18242  103514  177777
18243  103516  000000  000000  000000   4$:     .WORD   0,0,0,0         ;INTEGER RES.
18244  103524  000000
18245  103526  042200                   7$:     42200                   ;FPS BEFORE EXECUTION.
18246  103530  142204                           142204                  ;FPS AFTER EXECUTION.
18247  103532  000012                           12                      ;FEC
18248  103534                           8$:
18249  103534  104000                           EMT                     ;
18250                                   ;UNDERFLOW TEST WITH EXPONENT OF THE RESULT = -193, FIU = 0, FID = 1
18251  103536  004737  103746           NNN2:   JSR     PC,@#MODDOV
18252  103542  010000  000000           1$:     .WORD   10000,0         ;AC
18253  103546  123456  000000                   .WORD   123456,0
18254  103552  010200  000000  000000   2$:     .WORD   10200,0,0,0     ;FSRC
18255  103560  000000
18256  103562  000000  000000  000000   3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
18257  103570  000000
18258  103572  000000  000000  000000   4$:     .WORD   0,0,0,0         ;INTEGER RES.
18259  103600  000000
18260  103602  005213                   7$:     5213                    ;FPS BEFORE EXECUTION.
18261  103604  005204                           5204                    ;FPS AFTER EXECUTION.
18262  103606  000012                           12
18263  103610  000240                   8$:     NOP
18264                                   ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, FIV = 1, FID = 1
18265  103612  004737  103746           NNN3:   JSR     PC,@#MODDOV
18266  103616  060252  125252           1$:     .WORD   60252,125252    ;AC
18267  103622  125252  125252                   .WORD   125252,125252
18268  103626  060100  000000  000000   2$:     .WORD   60100,0,0,0     ;FSRC
18269  103634  000000
18270  103636  000000  000000  000000   3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
18271  103644  000000
18272  103646  000177  177777  177777   4$:     .WORD   177,-1,-1,-1    ;INTEGER RES.
18273  103654  177777
18274  103656  041200                   7$:     41200                   ;FPS BEFORE EXECUTION.
18275  103660  141206                           141206                  ;FPS AFTER EXECUTION.
18276  103662  000010                           10                      ;FEC
18277  103664                           8$:
18278  103664  104000                           EMT                     ;
18279                                   ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 130, FIV = 0, FID = 1
```

```
18280  103666  004737  103746          NNN4:   JSR     PC,@#MODDOV
18281  103672  060200  000000          1$:     .WORD   60200,0         ;AC
18282  103676  125252  000000                  .WORD   125252,0
18283  103702  060200  000000  000000  2$:     .WORD   60200,0,0,0     ;FSRC
18284  103710  000000
18285  103712  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
18286  103720  000000
18287  103722  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
18288  103730  000000
18289  103732  006211                  7$:     6211                    ;FPS BEFORE EXECUTION.
18290  103734  006206                          6206                    ;FPS AFTER EXECUTION.
18291  103736  000010                          10                      ;FEC
18292  103740  000240                  8$:     NOP
18293  103742  000137  104162          9$:     JMP     @#NNNDONE       ;GO TO NEXT TEST.
18294
18295                                  ;THIS SUBROUTINE, MODDOV, IS CALLED TO SETUP THE
18296                                  ;OPERANDS, EXECUTE THE MODD INSTRUCTION AND CHECK THE RESULTS.
18297                                  ;IT IS CALLED THUS:
18298                                  ;
18299                                  ;               ACARG:   .WORD   X,X,X,X         ;AC OPERAND
18300                                  ;               FSRCARG: .WORD   X,X,X,X         ;FSRC OPERAND
18301                                  ;               FRES:    .WORD   X,X,X,X         ;FRACTIONAL RESULT
18302                                  ;               INTRES:  .WORD   X,X,X,X         ;INTEGER RESULT
18303                                  ;               ERFRES:  .WORD   X,X,X,X         ;ERROR FRACTION RESULT
18304                                  ;               ERINTRES:.WORD   X,X,X,X         ;ERROR INTEGER RESULT
18305                                  ;               FPSB:    .WORD   X               ;FPS BEFORE EXECUTION
18306                                  ;               FPSA:    .WORD   X               ;FPS AFTER EXECUTION
18307                                  ;               ERR1:    ERROR   X               ;FRACTION ERROR
18308                                  ;                        BR      CONT
18309                                  ;               ERR2:    ERROR   X               ;INTEGER ERROR
18310                                  ;               CONT:                            ;RETURN ADDRESS
18311                                  ;
18312                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODD
18313                                  ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
18314                                  ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
18315                                  ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
18316                                  ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
18317                                  ;THEN MODDOV WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
18318                                  ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
18319                                  ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
18320                                  ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
18321                                  ;FAILURE MATCHES THE TRUE RESULT THEN  MODDOV PASSES CONTROL TO THE
18322                                  ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
18323                                  ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
18324                                  ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
18325                                  ;IF A MATCH IS MADE HOWEVER, MODDOV WILL RETURN CONTROL TO THE ERROR
18326                                  ;CALL AT ERR2.
18327
18328  103746  012601          MODDOV: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
18329  103750  012700  000200          MOV     #200,R0         ;SET FD MODE.
18330  103754  170100                  LDFPS   R0
18331  103756  010100                  MOV     R1,R0           ;SET UP AC0
18332  103760  172410                  LDD     (R0),AC0
18333  103762  012700  101572          MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
18334  103766  172510                  LDD     (R0),AC1
18335  103770  016100  000040          MOV     40(R1),R0       ;SET UP THE FPS.
```

```
18336  103774  170100                      LDFPS   R0
18337  103776  010100                      MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
18338  104000  062700  000010              ADD     #10,R0
18339
18340  104004  171410              1$:     MODD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
18341
18342  104006  170305                      STST    R5              ;GET THE FPS.
18343  104010  170204                      STFPS   R4              ;GET THE FPS.
18344  104012  012700  000200              MOV     #200,R0         ;SET FD MODE.
18345  104016  170100                      LDFPS   R0
18346  104020  012700  104142              MOV     #MODDD0,R0      ;GET THE FRACTIONAL RESULT.
18347  104024  174010                      STD     AC0,(R0)
18348  104026  012700  104152              MOV     #MODDD1,R0      ;GET THE INTEGER RESULT.
18349  104032  174110                      STD     AC1,(R0)
18350  104034  012702  104142              MOV     #MODDD0,R2      ;CHECK THE FRACTIONAL RESULT.
18351  104040  010103                      MOV     R1,R3
18352  104042  062703  000020              ADD     #20,R3
18353  104046  012700  000004              MOV     #4,R0
18354  104052  022223              2$:     CMP     (R2)+,(R3)+
18355  104054  001401                      BEQ     4$
18356  104056  104000                      EMT                     ;
18357  104060  077004              4$:     SOB     R0,2$
18358  104062  012702  104152              MOV     #MODDD1,R2      ;CHECK THE INTEGER RESULT
18359  104066  010103                      MOV     R1,R3
18360  104070  062703  000030              ADD     #30,R3
18361  104074  012700  000004              MOV     #4,R0
18362  104100  022223              3$:     CMP     (R2)+,(R3)+
18363  104102  001401                      BEQ     5$
18364  104104  104000                      EMT                     ;
18365  104106  077004              5$:     SOB     R0,3$
18366  104110  026104  000042              CMP     42(R1),R4       ;CHECK THE FPS.
18367  104114  001401                      BEQ     6$
18368  104116  104000                      EMT                     ;
18369  104120  026105  000044      6$:     CMP     44(R1),R5       ;CHECK THE FEC.
18370  104124  001002                      BNE     25$
18371
18372  104126  000161  000050      9$:     JMP     50(R1)          ;RETURN.
18373                              ;REPORT FEC ERROR.
18374  104132  010102              25$:    MOV     R1,R2
18375  104134  062702  000046              ADD     #46,R2
18376  104140  000112                      JMP     (R2)
18377
18378  104142  000000  000000  000000  MODDD0: .WORD   0,0,0,0
18379  104150  000000
18380
18381  104152  000000  000000  000000  MODDD1: .WORD   0,0,0,0
18382  104160  000000
18383
18384  104162                      NNNDONE:
18385  104162  004767  020404              JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18386                                                              ;SEE IF THE USER HAS EXPRESSED
18387                                                              ;THE DESIRE TO CHANGE THE SOFTWARE
18388                                                              ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18389                                                              ;THE USER TYPED CONTROL G?).
18390
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18392                                   ;*****************************************************************************
18393                                   ;TEST 511       MORE MICROCODES COVERAGE
18394                                   ;*****************************************************************************
18395  104166                           TS511:
18396  104166  012737  104202  000244  XT1:    MOV     #XT1A,@#244
18397  104174  170227  000000                  STFPS   #0
18398  104200  000401                          BR      XT2
18399  104202                           XT1A:
18400  104202  104000                          EMT                             ;
18401
18402  104204  012700  177777          XT2:    MOV     #-1,R0
18403  104210  170127  000000                  LDFPS   #0
18404  104214  170200                          STFPS   R0
18405  104216  005700                          TST     R0
18406  104220  001401                          BEQ     XT2A
18407  104222  104000                          EMT                             ;
18408  104224  012700  104760          XT2A:   MOV     #XPAT0,R0
18409  104230  172440                          LDF     -(R0),AC0
18410  104232  022700  104754                  CMP     #XPAT0-4,R0
18411  104236  001401                          BEQ     XT2B
18412  104240  104000                          EMT                             ;
18413  104242  170200                  XT2B:   STFPS   R0
18414  104244  022700  000004                  CMP     #4,R0                   ;CHECK IF FZ IS SET?
18415  104250  001401                          BEQ     XT3
18416  104252  104000                          EMT                             ;
18417  104254  170127  000000          XT3:    LDFPS   #0
18418  104260  012700  104760                  MOV     #XPAT0,R0
18419  104264  174040                          STF     AC0,-(R0)
18420  104266  022700  104754                  CMP     #XPAT0-4,R0
18421  104272  001401                          BEQ     XT3A
18422  104274  104000                          EMT                             ;
18423  104276  170200                  XT3A:   STFPS   R0
18424  104300  005700                          TST     R0
18425  104302  001401                          BEQ     XT4
18426  104304  104000                          EMT                             ;
18427
18428  104306  170127  000000          XT4:    LDFPS   #0
18429  104312  012737  104336  000244          MOV     #XT4A,@#244
18430  104320  170127  004000                  LDFPS   #04000                  ;INTRPT ON UNDEFINED VARIABLE
18431  104324  172437  104760                  LDF     @#XPAT0,AC0
18432  104330  174437  105010                  DIVF    @#XPAT3,AC0             ;GET UNDEFINED VARIABLE, _0
18433  104334  104000                          EMT                             ;
18434  104336  170200                  XT4A:   STFPS   R0
18435  104340  022700  104004                  CMP     #104004,R0              ;CHECK: FER,FIUV,FZ ARE SET?
18436  104344  001401                          BEQ     XT4B
18437  104346  104000                          EMT                             ;
18438  104350  012700  104750          XT4B:   MOV     #XBUF,R0
18439  104354  174010                          STF     AC0,(R0)
18440  104356  005737  104750                  TST     @#XBUF
18441  104362  001401                          BEQ     XT5
18442  104364  104000                          EMT                             ;
18443
18444  104366  012737  104406  000244  XT5:    MOV     #XT5A,@#244
18445  104374  170127  004000                  LDFPS   #04000                  ;INTRPT ON UNDEFINED VARIBALE
18446  104400  177437  105010                  LDCDF   @#XPAT3,AC0             ;GET UNDEFINED VARIABLE, _0
18447  104404  104000                          EMT                             ;
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18448  104406  170200                 XT5A:   STFPS   R0
18449  104410  022700  104014                 CMP     #104014,R0      ;CHECK: FER,FIUV,FN,FZ ARE SET?
18450  104414  001401                         BEQ     XT5B
18451  104416  104000                         EMT                     ;
18452  104420  012700  104750         XT5B:   MOV     #XBUF,R0
18453  104424  174010                         STF     AC0,(R0)
18454  104426  005737  104750                 TST     @#XBUF
18455  104432  001401                         BEQ     XT6
18456  104434  104000                         EMT                     ;
18457
18458  104436  012737  104462  000244   XT6:    MOV     #XT6A,@#244
18459  104444  170127  004000                 LDFPS   #04000          ;INTRPT ON UNDEFINED VARIBALE
18460  104450  172437  104760                 LDF     @#XPAT0,AC0
18461  104454  172037  105010                 ADDF    @#XPAT3,AC0
18462  104460  104000                         EMT                     ;
18463  104462  170200                 XT6A:   STFPS   R0
18464  104464  022700  104004                 CMP     #104004,R0      ;CHECK: FER,FIUV,FZ ARE SET?
18465  104470  001401                         BEQ     XT6B
18466  104472  104000                         EMT                     ;
18467  104474  012700  104750         XT6B:   MOV     #XBUF,R0
18468  104500  174010                         STF     AC0,(R0)
18469  104502  005737  104750                 TST     @#XBUF
18470  104506  001401                         BEQ     XT7
18471  104510  104000                         EMT                     ;
18472
18473  104512  170127  000000         XT7:    LDFPS   #0
18474  104516  172437  105020                 LDF     @#XPAT4,AC0
18475  104522  175437  105050                 STCFI   AC0,@#XPAT0
18476  104526  022737  000002  105050         CMP     #2,@#XPAT0      ;CHECK DATA
18477  104534  001401                         BEQ     XT8
18478  104536  104000                         EMT                     ;
18479
18480  104540  170127  000100         XT8:    LDFPS   #100            ;SET FL
18481  104544  172437  105020                 LDF     @#XPAT4,AC0
18482  104550  175467  000274                 STCFI   AC0,XPAT0
18483  104554  022737  000002  105052         CMP     #2,@#XPAT0+2
18484  104562  001401                         BEQ     XT9
18485  104564  104000                         EMT                     ;
18486
18487                          ;START OF FPP2
18488  104566  170127  000000         XT9:    LDFPS   #0
18489  104572  172437  104760                 LDF     @#XPAT0,AC0
18490  104576  172037  105020                 ADDF    @#XPAT4,AC0
18491  104602  170200                         STFPS   R0
18492  104604  005700                         TST     R0
18493  104606  001401                         BEQ     XT10
18494  104610  104000                         EMT                     ;
18495
18496  104612  170127  000000         XT10:   LDFPS   #0
18497  104616  172437  105020                 LDF     @#XPAT4,AC0
18498  104622  173037  105020                 SUBF    @#XPAT4,AC0
18499  104626  170200                         STFPS   R0
18500  104630  022700  000004                 CMP     #4,R0
18501  104634  001401                         BEQ     XT11
18502  104636  104000                         EMT                     ;
18503
```

```
18504  104640  170127  000000          XT11:   LDFPS   #0
18505  104644  172437  105020                  LDF     @#XPAT4,AC0
18506  104650  173437  105020                  CMPF    @#XPAT4,AC0
18507  104654  170200                          STFPS   R0
18508  104656  022700  000004                  CMP     #4,R0           ;CHECK IF FZ IS SET?
18509  104662  001401                          BEQ     XT12
18510  104664  104000                          EMT                     ;
18511
18512  104666  170127  000000          XT12:   LDFPS   #0
18513  104672  172437  105020                  LDF     @#XPAT4,AC0
18514  104676  174437  105000                  DIVF    @#XPAT2,AC0
18515  104702  012700  104750                  MOV     #XBUF,R0
18516  104706  174010                          STF     AC0,(R0)
18517  104710  022737  040176  104750          CMP     #040176,@#XBUF  ;CHECK DATA
18518  104716  001401                          BEQ     XT13
18519  104720  104000                          EMT                     ;
18520
18521  104722  170127  000000          XT13:   LDFPS   #0
18522  104726  172437  105030                  LDF     @#XPAT5,AC0
18523  104732  174437  105040                  DIVF    @#XPAT6,AC0
18524  104736  170200                          STFPS   R0
18525  104740  022700  000004                  CMP     #4,R0
18526  104744  001445                          BEQ     XTDONE
18527  104746  104000                          EMT                     ;
18528
18529
18530  104750  000000  000000  000000  XBUF:   .WORD   0,0,0,0
18531  104756  000000
18532  104760  000000  000000  000000  XPAT0:  .WORD   0,0,0,0
18533  104766  000000
18534  104770  000001  000001  000001  XPAT1:  .WORD   1,1,1,1
18535  104776  000001
18536  105000  040401  000000  000000  XPAT2:  .WORD   40401,0,0,0
18537  105006  000000
18538  105010  100000  000000  000000  XPAT3:  .WORD   100000,0,0,0
18539  105016  000000
18540  105020  040400  000000  000000  XPAT4:  .WORD   040400,0,0,0
18541  105026  000000
18542  105030  000207  000000  000000  XPAT5:  .WORD   207,0,0,0
18543  105036  000000
18544  105040  077007  000000  000000  XPAT6:  .WORD   77007,0,0,0
18545  105046  000000
18546  105050  000000  000000  000000  XPAT0:  .WORD   0,0,0,0
18547  105056  000000
18548
18549  105060                          XTDONE:
18550  105060  004767  017506                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18551                                                                  ;SEE IF THE USER HAS EXPRESSED
18552                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
18553                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18554                                                                  ;THE USER TYPED CONTROL G?).
18555
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18559                           ;*****************************************************************************************
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18560                                   ;TEST 512       STF WITH ILLEGAL ACCUMULATOR TEST
18561                                   ;*****************************************************************************
18562  105064                           TS512:
18563
18564  105064  005000                           CLR     R0              ;SET THE FPS.
18565  105066  170100                           LDFPS   R0
18566
18567  105070  012737  105110  000244           MOV     #OOOT,@#FPVECT  ;SET UP FOR FP TRAPS.
18568  105076  012737  105104  037364           MOV     #1$,@#$TMP2
18569
18570  105104  174007                   1$:     STF     AC0,AC7         ;THIS TEST INSTRUCTION SHOULD
18571                                                                   ;CAUSE A TRAP.
18572
18573                                   ;REPORT FAILURE OF USE OF ILLEGAL ACCUMULATOR 7 TO CAUSE AN FPP TRAP.
18574  105106                           0002:
18575  105106  104000                           EMT                     ;INSTRUCTION DID NOT TRAP
18576
18577                                   ;TRAP TO OOOT, HERE, WHEN THE EXPECTED ERROR OCCURS.
18578  105110  011600                   OOOT:   MOV     (SP),R0         ;MAKE SURE THE ERROR OCCURRED
18579  105112  022700  105106                   CMP     #0002,R0        ;AT THE CORRECT ADDRESS.
18580  105116  001420                           BEQ     TS513
18581  105120  104000                           EMT                     ;FLOATING POINT TRAP DID NOT OPERATE RIGHT
18582
18583  105122  170204                   0003:   STFPS   R4              ;GET FPS.
18584  105124  170305                           STST    R5              ;GET FEC.
18585  105126  012702  100000                   MOV     #100000,R2      ;EXPECTED FPS
18586  105132  012703  000002                   MOV     #2,R3           ;EXPECTED FEC
18587  105136  022626                           CMP     (SP)+,(SP)+     ;RESET THE STACK.
18588
18589  105140  020204                           CMP     R2,R4           ;WAS FPS CORRECT?
18590  105142  001401                           BEQ     0004
18591  105144  104000                           EMT                     ;FPS INCORRECTLY SET AFTER USE OF ILLEGAL ACC
18592  105146  020305                   0004:   CMP     R3,R5           ;WAS THE FEC CORRECT?
18593  105150  001401                           BEQ     OOODONE
18594  105152  104000                           EMT                     ;INCORRECT FEC AFTER USE OF ILLEGAL ACC
18595
18596  105154                           OOODONE:
18597  105154  004767  017412                   JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18598                                                                   ;SEE IF THE USER HAS EXPRESSED
18599                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
18600                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18601                                                                   ;THE USER TYPED CONTROL G?).
18602
18603
18604
18605
18606                                   ;*****************************************************************************
18607                                   ;TEST 513       FDST MODE 1, FLOATING MODE, TEST
18608                                   ;*****************************************************************************
18609  105160                           TS513:
18610
18611
18612  105160  012700  177777                   MOV     #-1,R0          ;SET UP A BACKROUND PATTERN IN THE
18613  105164  012701  105274                   MOV     #PPPBF0,R1      ;INPUT BUFFER.
18614  105170  012702  000014                   MOV     #14,R2
18615  105174  010021                   PPP2:   MOV     R0,(R1)+
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18616  105176  077202                  SOB     R2,PPP2
18617
18618  105200  012700  000200          MOV     #200,R0         ;SET FD MODE.
18619  105204  170100                  LDFPS   R0
18620  105206  012700  105324          MOV     #PPPTP1,R0      ;PUT TEST DATA INTO AC0.
18621  105212  172410                  LDD     (R0),AC0
18622
```

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18623  105214  012700  105310          MOV     #PPPBF1,R0      ;FDST ADDRESS.
18624  105220  005002                  CLR     R2              ;CLEAR THE FPS.
18625  105222  170102                  LDFPS   R2
18626
18627  105224  174010          PPP3:   STF     AC0,(R0)        ;TEST INSTRUCTION.
18628
18629  105226  022700  105310          CMP     #PPPBF1,R0      ;WAS R0 MODIFIED DURING EXECUTION?
18630  105232  001401                  BEQ     PPP4
18631  105234  104000                  EMT                     ;R0 MODIFIED
18632
18633  105236  012700  105310  PPP4:   MOV     #PPPBF1,R0      ;CHECK THE DATA IN THE OUTPUT BUFFER.
18634  105242  012701  105324          MOV     #PPPTP1,R1
18635  105246  022021                  CMP     (R0)+,(R1)+
18636  105250  001031                  BNE     PPP10           ;BRANCH IF INCORRECT.
18637  105252  022011                  CMP     (R0)+,(R1)
18638  105254  001027                  BNE     PPP10           ;BRANCH IF INCORRECT.
18639  105256  022720  177777          CMP     #-1,(R0)+       ;WAS FLOATING MODE USED?
18640  105262  001024                  BNE     PPP10           ;BRANCH IF NOT.
18641  105264  022710  177777          CMP     #-1,(R0)
18642  105270  001021                  BNE     PPP10
18643  105272  000421                  BR      PPPDONE ;GO TO NEXT TEST.
18644
18645  105274  177777  177777  177777  PPPBF0: .WORD   -1,-1,-1,-1,-1,-1
18646  105302  177777  177777  177777
18647
18648  105310  177777  177777  177777  PPPBF1: .WORD   -1,-1,-1,-1,-1,-1
18649  105316  177777  177777  177777
18650
18651  105324  123456  023456          PPPTP1: .WORD   123456,23456
18652  105330  034567  045671                  .WORD   34567,45671
18653
18654  105334                          PPP10:
18655  105334  104000                          EMT                     ;
18656  105336                          PPPDONE:
18657  105336  004767  017230                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
18658                                                                  ;SEE IF THE USER HAS EXPRESSED
18659                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
18660                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18661                                                                  ;THE USER TYPED CONTROL G?).
18662
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18664
18665
18666                           ;*************************************************************************************
18667                           ;TEST 514       FDST MODE 2 TEST
18668                           ;*************************************************************************************
18669  105342                  TS514:
18670
18671                           ;FIRST TEST STF.
18672
18673  105342  012700  177777          MOV     #-1,R0  ;SET UP THE OUTPUT BUFFER.
18674  105346  012701  105456          MOV     #QQQBF0,R1
18675  105352  012702  000014          MOV     #14,R2
18676  105356  010021          QQQ2:   MOV     R0,(R1)+
18677  105360  077202                  SOB     R2,QQQ2
18678
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```
18679  105362  012700  000200          MOV     #200,R0         ;SET FD MODE.
18680  105366  170100                  LDFPS   R0
18681  105370  012700  105506          MOV     #QQQTP1,R0      ;SETUP AC0.
18682  105374  172410                  LDD     (R0),AC0
18683
18684  105376  012700  105472          MOV     #QQQBF1,R0      ;FDST ADDRESS.
18685  105402  005002                  CLR     R2
18686  105404  170102                  LDFPS   R2              ;SET FPS.
18687  105406  174020          QQQ3:   STF     AC0,(R0)+       ;TEST INSTRUCTION.
18688
18689  105410  022700  105476          CMP     #QQQBF1+4,R0    ;WAS R0 INCREMENTED BY 4 PROPERLY?
18690
18691  105414  001401                  BEQ     QQQ4
18692  105416  104000                  EMT                     ;REPORT R0 INCORRECT AFTER FDST MODE 2
18693  105420  012700  105472  QQQ4:   MOV     #QQQBF1,R0      ;WAS THE OUTPUT DATA CORRECT?
18694  105424  012701  105506          MOV     #QQQTP1,R1
18695  105430  022021                  CMP     (R0)+,(R1)+
18696  105432  001031                  BNE     QQQ10           ;BRANCH IF INCORRECT.
18697  105434  022021                  CMP     (R0)+,(R1)+
18698  105436  001027                  BNE     QQQ10           ;BRANCH IF INCORRECT.
18699  105440  022027  177777          CMP     (R0)+,#-1       ;SEE IF ANY OTHER DATA BUFFER WORDS WERE MODIFIED.
18700  105444  001024                  BNE     QQQ10           ;BRANCH IF INCORRECT.
18701  105446  022027  177777          CMP     (R0)+,#-1
18702  105452  001021                  BNE     QQQ10           ;BRANCH IF INCORRECT.
18703  105454  000421                  BR      QQQ20
18704  105456  177777  177777  177777 QQQBF0: .WORD   -1,-1,-1,-1,-1,-1
18705  105464  177777  177777  177777
18706  105472  177777  177777  177777 QQQBF1: .WORD   -1,-1,-1,-1,-1,-1
18707  105500  177777  177777  177777
18708  105506  076543          QQQTP1: 76543
18709  105510  065432                  65432
18710  105512  054321                  54321
18711  105514  043210                  43210
18712                          ;REPORT OUTPUT DATA INCORRECT:
18713  105516                  QQQ10:
18714  105516  104000                  EMT                     ;
18715
18716                          ;NOW TEST STD MODE 2.
18717
18718  105520  012700  105456  QQQ20:  MOV     #QQQBF0,R0      ;SET UP DEFAULT INPUT DATA BUFFER.
18719  105524  010001                  MOV     R0,R1
18720  105526  012702  000014          MOV     #14,R2
18721  105532  010021          QQQ22:  MOV     R0,(R1)+
18722  105534  077202                  SOB     R2,QQQ22
18723  105536  012700  000200          MOV     #200,R0         ;ENTER FLOATING DOUBLE MODE.
18724  105542  170100                  LDFPS   R0
18725  105544  012700  105506          MOV     #QQQTP1,R0      ;LOAD AC0.
18726  105550  172410                  LDD     (R0),AC0
18727  105552  012700  105472          MOV     #QQQBF1,R0      ;SET DESTINATION ADDRESS.
18728  105556  012737  105564  037364  MOV     #QQQ23,@#$TMP2
18729  105564  174020          QQQ23:  STD     AC0,(R0)+       ;TEST INSTRUCTION.
18730  105566  022700  105502          CMP     #QQQBF1+10,R0   ;WAS R0 INCREMENTED BY 10 CORRECTLY?
18731  105572  001401                  BEQ     QQQ24
18732  105574  104000                  EMT                     ;REPORT R0 INCORRECTLY INCREMENTED
18733  105576  012700  105472  QQQ24:  MOV     #QQQBF1,R0      ;DID THE DATA REACH THE OUTPUT BUFFER CORRECTLY?
18734  105602  012701  105506          MOV     #QQQTP1,R1
```

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18735  105606  012702  000004          MOV     #4,R2
18736  105612  022021          1$:     CMP     (R0)+,(R1)+
18737  105614  001002                  BNE     QQQ25           ;BRANCH IF INCORRECT.
18738  105616  077203                  SOB     R2,1$
18739  105620  000401                  BR      QQQDONE
18740                          ;REPORT DATA INCORRECT.
18741  105622                  QQQ25:
18742  105622  104000                  EMT                     ;
18743  105624                  QQQDONE:
18744  105624  004767  016742          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18745                                                          ;SEE IF THE USER HAS EXPRESSED
18746                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
18747                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18748                                                          ;THE USER TYPED CONTROL G?).
18749
18750                          ;*****************************************************************************
18751                          ;TEST 515       FDST MODE 2, WITH GR7, TEST
18752                          ;*****************************************************************************
18753  105630                  TS515:
18754
18755  105630  012700  105700          MOV     #RRR3,R0        ;SET UP THE DATA BUFFER FOLLOWING THE TEST INSTRUCTION.
18756  105634  012701  105746          MOV     #RRRTP1,R1
18757  105640  012702  000004          MOV     #4,R2
18758  105644  012021          1$:     MOV     (R0)+,(R1)+
18759  105646  077202                  SOB     R2,1$
18760  105650  012700  000200          MOV     #200,R0         ;ENTER FLOATING DOUBLE MODE.
18761  105654  170100                  LDFPS   R0
18762  105656  012700  105756          MOV     #RRRTP2,R0      ;SET UP AC0.
18763  105662  172410                  LDD     (R0),AC0
18764  105664  012737  105744  000004  MOV     #RRR10,@#ERRVECT ;SET UP FOR AN ODD ADDRESS.
18765  105672  005001                  CLR     R1
18766  105674  005004                  CLR     R4
18767                          ;THIS IS THE TEST INSTRUCTION. IT SHOULD MODIFY THE FIRST LOCATION
18768                          ;AFTER IT TO BE AN INCREMENT R4, INC R4, INSTRUCTION INSTEAD
18769                          ;OF AN INCREMENT R1 INSTRUCTION. THE INCREMENT R4 SHOULD NOT BE
18770                          ;EXECUTED SINCE THE PC SHOULD BE INCREMENTED BY TWO DURING IMMEDIATE
18771                          ;MODE ADDRESSING. THUS AFTER THE EXECUTION OF THE NEXT 5 INSTRUCTIONS
18772                          ;R1 SHOULD CONTAIN 3 AND R4 SHOULD CONTAIN 0.
18773  105676  174027          RRR2:   STD     AC0,(R7)+       ;TEST INSTRUCTION.
18774  105700  005201          RRR3:   INC     R1              ;THE STD INSTRUCTION SHOULD CHANGE THIS TO INC R4.
18775  105702  005201                  INC     R1
18776  105704  005201                  INC     R1
18777  105706  005201                  INC     R1
18778  105710  012700  105766          MOV     #RRREXP,R0      ;SEE IF THE DATA WAS OUTPUT CORRECTLY.
18779  105714  012702  105700          MOV     #RRR3,R2
18780  105720  012703  000004          MOV     #4,R3
18781  105724  022022          RRR4:   CMP     (R0)+,(R2)+
18782  105726  001006                  BNE     RRR10           ;BRANCH IF INCORRECT.
18783  105730  077303                  SOB     R3,RRR4
18784  105732  005704                  TST     R4              ;MAKE SURE R4 IS 0.
18785  105734  001003                  BNE     RRR10           ;BRANCH IF R4 IS INCORRECT.
18786  105736  022701  000003          CMP     #3,R1           ;SEE IF R1 IS CORRECT.
18787  105742  001415                  BEQ     RRRDONE
18788  105744                  RRR10:
18789  105744  104000                  EMT                     ;
18790                          ;THESE ARE TEST DATA PATTERNS USED TO SET UP THE OUTPUT BUFFER AT RRR3.
```

```
18791  105746  005201                  RRRTP1: INC     R1
18792  105750  005201                          INC     R1
18793  105752  005201                          INC     R1
18794  105754  005201                          INC     R1
18795                                  ;THIS IS THE DATA PUT IN AC0 BEFORE EXECUTION OF THE STD.
18796  105756  005204                  RRRTP2: INC     R4
18797  105760  005204                          INC     R4
18798  105762  005204                          INC     R4
18799  105764  005204                          INC     R4
18800                                  ;THIS IS THE EXPECTED DATA AT RRR3 AFTER EXECUTION OF THE STD.
18801  105766  005204                  RRREXP: INC     R4
18802  105770  005201                          INC     R1
18803  105772  005201                          INC     R1
18804  105774  005201                          INC     R1
18805  105776                          RRRDONE:
18806  105776  004767  016570                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
18807                                                                  ;SEE IF THE USER HAS EXPRESSED
18808                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
18809                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18810                                                                  ;THE USER TYPED CONTROL G?).
18811
18812                                  ;*****************************************************************************
18813                                  ;TEST 516       FDST MODE 4 TEST
18814                                  ;*****************************************************************************
18815  106002                          TS516:
18816
18817  106002  012700  177777                  MOV     #-1,R0          ;SET UP THE OUTPUT BUFFER.
18818  106006  012701  106130                  MOV     #SSSBF0,R1
18819  106012  012702  000010                  MOV     #10,R2
18820  106016  010021                  1$:     MOV     R0,(R1)+
18821  106020  077202                          SOB     R2,1$
18822  106022  012700  000200                  MOV     #200,R0         ;ENTER FLOATING DOUBLE MODE.
18823  106026  170100                          LDFPS   R0
18824  106030  012700  106150                  MOV     #SSSTP1,R0      ;SET UP AC0.
18825  106034  172410                          LDD     (R0),AC0
18826  106036  012737  106160  000004          MOV     #SSS10,@#ERRVECT ;SET UP FOR A TRAP TO 4.
 8827  106044  012700  106140                  MOV     #SSSA1,R0       ;SET UP THE DESTINATION ADDRESS.
18828
18829  106050  174040                  SSS2:   STD     AC0,-(R0)       ;TEST INSTRUCTION.
18830  106052  005201                          INC     R1
18831  106054  020027  106130                  CMP     R0,#SSSBF0      ;SEE IF R0 WAS DECREMENTED PROPERLY.
18832  106060  001037                          BNE     SSS10           ;BRANCH IF R0 IS INCORRECT.
18833  106062  012700  106130                  MOV     #SSSBF0,R0      ;WAS THE OUTPUT DATA CORRECT?
18834  106066  012701  106150                  MOV     #SSSTP1,R1
18835  106072  012702  000004                  MOV     #4,R2
18836  106076  022021                  1$:     CMP     (R0)+,(R1)+
18837  106100  001027                          BNE     SSS10           ;BRANCH IF INCORRECT.
18838  106102  077203                          SOB     R2,1$
18839  106104  012700  177777                  MOV     #-1,R0          ;IS THE REST OF THE OUTPUT BUFFER CORRECT, -1?
18840  106110  012701  106140                  MOV     #SSSA1,R1
18841  106114  012702  000004                  MOV     #4,R2
18842  106120  020021                  2$:     CMP     R0,(R1)+
18843  106122  001016                          BNE     SSS10           ;BRANCH IF INCORRECT.
18844  106124  077203                          SOB     R2,2$
18845  106126  000415                          BR      SSSDONE
18846
```

```
18847
18848  106130  177777                ;THIS IS THE OUTPUT DATA BUFFER.
18849  106132  177777                SSSBF0: -1
18850  106134  177777                        -1
18851  106136  177777                        -1
18852  106140  177777                SSSA1:  -1
18853  106142  177777                        -1
18854  106144  177777                        -1
18855  106146  177777                        -1
18856
18857                                ;THIS IS THE TEST DATA LOADED INTO AC0:
18858  106150  147250                SSSTP1: 147250
18859  106152  036147                        36147
18860  106154  025036                        25036
18861  106156  147250                        147250
18862
18863  106160                        SSS10:
18864  106160  104000                        EMT                     ;
18865  106162                        SSSDONE:
18866  106162  004767  016404                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18867                                                                ;SEE IF THE USER HAS EXPRESSED
18868                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
18869                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18870                                                                ;THE USER TYPED CONTROL G?).
18871
18872                                ;*******************************************************************************
18873                                ;TEST 517       FDST MODE 3 TEST
18874                                ;*******************************************************************************
18875  106166                        TS517:
18876
18877  106166  012701  106276                MOV     #TTTBF0,R1      ;SET UP THE OUTPUT DATA BUFFER.
18878  106172  012700  177777                MOV     #-1,R0
18879  106176  012702  000013                MOV     #13,R2
18880  106202  010021                1$:     MOV     R0,(R1)+
18881  106204  077202                        SOB     R2,1$
18882  106206  012737  106276  106312        MOV     #TTTBF0,@#TTTA2
18883  106214  012700  000200                MOV     #200,R0         ;ENTER DOUBLE FLOATING MODE.
18884  106220  170100                        LDFPS   R0
18885  106222  012700  106314                MOV     #TTTTP1,R0      ;SET UP AC0.
18886  106226  172410                        LDD     (R0),AC0
18887  106230  012737  106324  000004        MOV     #TTT10,@#ERRVECT ;SET UP FOR TRAPS TO 4.
18888  106236  012700  106312                MOV     #TTTA2,R0       ;SET UP THE DESTINATION ADDRESS.
18889
18890  106242  174030                TTT2:   STD     AC0,@(R0)+      ;TEST INSTRUCTION.
18891
18892  106244  020027  106314                CMP     R0,#TTTA2+2     ;SEE IF R0 WAS INCREMENTED CORRECTLY.
18893  106250  001025                        BNE     TTT10           ;BRANCH IF INCORRECT.
18894  106252  012701  106276                MOV     #TTTBF0,R1      ;CHECK THE OUTPUT DATA BUFFER.
18895  106256  012702  106314                MOV     #TTTTP1,R2
18896  106262  012703  000004                MOV     #4,R3
18897  106266  022122                TTT3:   CMP     (R1)+,(R2)+
18898  106270  001015                        BNE     TTT10           ;BRANCH IF NOT CORRECT.
18899  106272  077303                        SOB     R3,TTT3
18900  106274  000414                        BR      TTTDONE
18901
18902                                ;THIS IS THHE OUTPUT DATA BUFFER:
```

```
18903  106276  177777                  TTTBF0: -1
18904  106300  177777                          -1
18905  106302  177777                          -1
18906  106304  177777                          -1
18907  106306  177777                          -1
18908  106310  177777                  TTTA1:  -1
18909  106312  106276                  TTTA2:  TTTBF0
18910  106314  101213                  TTTTP1: 101213
18911  106316  141516                          141516
18912  106320  071727                          71727
18913  106322  037475                          37475
18914
18915  106324                          TTT10:
18916  106324  104000                          EMT                     ;
18917
18918  106326                          TTTDONE:
18919  106326  004767  016240                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18920                                                                  ;SEE IF THE USER HAS EXPRESSED
18921                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
18922                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18923                                                                  ;THE USER TYPED CONTROL G?).
18924
18925                          ;*****************************************************************************
18926                          ;TEST 520       FDST MODE 5 TEST
18927                          ;*****************************************************************************
18928  106332                  TS520:
18929
18930  106332  012701  106442                  MOV     #UUUBF0,R1      ;SET UP THE OUTPUT DATA BUFFER.
18931  106336  012700  177777                  MOV     #-1,R0
18932  106342  012702  000013                  MOV     #13,R2
18933  106346  010021                  1$:     MOV     R0,(R1)+
18934  106350  077202                          SOB     R2,1$
18935  106352  012737  106442  106454          MOV     #UUUBF0,@#UUUA1
18936  106360  012700  000200                  MOV     #200,R0         ;ENTER DOUBLE FLOATING MODE.
18937  106364  170100                          LDFPS   R0
18938  106366  012700  106460                  MOV     #UUUTP1,R0      ;SET UP AC0.
18939  106372  172410                          LDD     (R0),AC0
18940  106374  012737  106470  000004          MOV     #UUU10,@#ERRVECT ;GET READY FOR ANY TRAPS TO 4.
18941  106402  012700  106456                  MOV     #UUUA2,R0       ;SET UP THE DESTINATION ADDRESS.
18942  106406  174050                  UUU2:   STD     AC0,@-(R0)      ;TEST INSTRUCTION.
18943  106410  020027  106454                  CMP     R0,#UUUA2-2     ;WAS R0 DECRIMENTED PROPERLY?
18944  106414  001025                          BNE     UUU10           ;BRANCH IF R0 IS INCORRECT.
18945  106416  012701  106442                  MOV     #UUUBF0,R1      ;WAS THE DATA OUTPUT CORRECTLY?
18946  106422  012702  106460                  MOV     #UUUTP1,R2
18947  106426  012703  000004                  MOV     #4,R3
18948  106432  022122                  UUU3:   CMP     (R1)+,(R2)+
18949  106434  001015                          BNE     UUU10           ;BRANCH IF DATA IS INCORRECT.
18950  106436  077303                          SOB     R3,UUU3
18951  106440  000414                          BR      UUUDONE
18952
18953                                  ;THIS IS THE OUTPUT DATA BUFFER
18954  106442  177777                  UUUBF0: -1
18955  106444  177777                          -1
18956  106446  177777                          -1
18957  106450  177777                          -1
18958  106452  177777                          -1
```

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18959  106454  106442                  UUUA1:  UUUBF0
18960  106456  177777                  UUUA2:  -1
18961  106460  020212                  UUUTP1: 20212
18962  106462  023242                          23242
18963  106464  026273                          26273
18964  106466  031323                          031323
18965
18966  106470                          UUU10:
18967  106470  104000                          EMT                     ;
18968  106472                          UUUDONE:
18969  106472  004767  016074                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
18970                                                                  ;SEE IF THE USER HAS EXPRESSED
18971                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
18972                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
18973                                                                  ;THE USER TYPED CONTROL G?).
18974
18975                                  ;*****************************************************************************
18976                                  ;TEST 521       FDST MODE 6, INDEX MODE, TEST
18977                                  ;*****************************************************************************
18978  106476                          TS521:
18979
18980  106476  012700  000200                  MOV     #200,R0         ;ENTER DOUBLE FLOATING MODE.
18981  106502  170100                          LDFPS   R0
18982  106504  012701  106606                  MOV     #VVVBF0,R1      ;SET UP THE OUT PUT DATA BUFFER.
18983  106510  012700  177777                  MOV     #-1,R0
18984  106514  012702  000004                  MOV     #4,R2
18985  106520  010021                  1$:     MOV     R0,(R1)+
18986  106522  077202                          SOB     R2,1$
18987  106524  012737  106626  000004        MOV     #VVV10,@#ERRVECT ;SET UP VECTOR 4 INCASE OF ERROR.
18988  106532  012700  106616                  MOV     #VVVTP1,R0      ;SET UP AC0.
18989  106536  172410                          LDD     (R0),AC0
18990  106540  012700  100705                  MOV     #VVVBF0-5701,R0 ;SET UP THE DESTINATION ADDRESS.
18991  106544  012701  000001                  MOV     #1,R1
18992  106550  174060  005701          VVV2:   STD     AC0,5701(R0)    ;TEST INSTRUCTION.
18993
18994  106554  020027  100705                  CMP     R0,#VVVBF0-5701 ;SEE IF R0 WAS MODIFIED.
18995  106560  001022                          BNE     VVV10           ;BRANCH IF INCORRECT.
18996  106562  012702  106606                  MOV     #VVVBF0,R2      ;WAS THE OUTPUT DATA CORRECT.
18997  106566  012703  106616                  MOV     #VVVTP1,R3
18998  106572  012704  000004                  MOV     #4,R4
18999  106576  022223                  1$:     CMP     (R2)+,(R3)+
19000  106600  001012                          BNE     VVV10           ;BRANCH IF INCORRECT DATA.
19001  106602  077403                          SOB     R4,1$
19002  106604  000411                          BR      VVVDONE
19003  106606  177777                  VVVBF0: -1
19004  106610  177777                          -1
19005  106612  177777                          -1
19006  106614  177777                          -1
19007  106616  030313                  VVVTP1: 30313
19008  106620  023334                          23334
19009  106622  035363                          35363
19010  106624  074041                          74041
19011
19012  106626                          VVV10:
19013  106626  104000                          EMT                     ;
19014  106630                          VVVDONE:
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19015  106630  004767  015736                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19016                                                                   ;SEE IF THE USER HAS EXPRESSED
19017                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
19018                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19019                                                                   ;THE USER TYPED CONTROL G?).
19020
19021                                   ;*****************************************************************************
19022                                   ;TEST 522       FDST MODE 7, INDEX DEFERRED MODE, TEST
19023                                   ;*****************************************************************************
19024  106634                           TS522:
19025
19026  106634  012700  000200                  MOV     #200,R0         ;ENTER DOUBLE FLOATING MODE.
19027  106640  170100                          LDFPS   R0
19028  106642  012701  106752                  MOV     #WWWBF0,R1      ;SET UP THE OUTPUT DATA BUFFER.
19029  106646  012700  177777                  MOV     #-1,R0
19030  106652  012702  000004                  MOV     #4,R2
19031  106656  010021                  1$:     MOV     R0,(R1)+
19032  106660  077202                          SOB     R2,1$
19033  106662  012737  107002  000004          MOV     #WWW10,@#ERRVECT ;SET UP FOR TRAPS TO 4.
19034  106670  012700  106762                  MOV     #WWWTP1,R0      ;SET UP AC0.
19035  106674  172410                          LDD     (R0),AC0
19036  106676  012700  101071                  MOV     #WWWBF1-5701,R0 ;SET UP THE DESTINATION ADDRESS.
19037  106702  012701  000001                  MOV     #1,R1
19038  106706  012737  106752  106772          MOV     #WWWBF0,@#WWWBF1
19039  106714  174070  005701          WWW2:   STD     AC0,@5701(R0)   ;TEST INSTRUCTION.
19040
19041  106720  020027  101071                  CMP     R0,#WWWBF1-5701 ;IS R0 CORRECT?
19042  106724  001026                          BNE     WWW10           ;BRANCH IF INCORRECT.
19043  106726  012702  106752                  MOV     #WWWBF0,R2      ;WAS THE DATA OUTPUT CORRECTLY?
19044  106732  012703  106762                  MOV     #WWWTP1,R3
19045  106736  012704  000004                  MOV     #4,R4
19046  106742  022223                  1$:     CMP     (R2)+,(R3)+
19047  106744  001016                          BNE     WWW10           ;BRANCH IF DATA IS INCORRECT.
19048  106746  077403                          SOB     R4,1$
19049  106750  000415                          BR      WWWDONE
19050  106752  177777                  WWWBF0: -1
19051  106754  177777                          -1
19052  106756  177777                          -1
19053  106760  177777                          -1
19054  106762  041424                  WWWTP1: 41424
19055  106764  034445                          34445
19056  106766  046475                          46475
19057  106770  051525                          051525
19058  106772  177777                  WWWBF1: -1
19059  106774  177777                          -1
19060  106776  177777                          -1
19061  107000  177777                          -1
19062
19063  107002                           WWW10:
19064  107002  104000                          EMT                     ;
19065  107004                           WWWDONE:
19066  107004  004767  015562                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19067                                                                   ;SEE IF THE USER HAS EXPRESSED
19068                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
19069                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19070                                                                   ;THE USER TYPED CONTROL G?).
```

```
19071
19072                                   ;*****************************************************************************************
19073                                   ;TEST 523       STCFD TEST
19074                                   ;*****************************************************************************************
19075  107010                           TS523:
19076
19077                                   ;AC=0
19078  107010  004767  000262          XXX1:   JSR     PC,STCFDS
19079  107014  000000                  1$:     0               ;AC
19080  107016  000000                          0
19081  107020  000000                          0
19082  107022  000000                          0
19083  107024  000000                  2$:     0               ;RES
19084  107026  000000                          0
19085  107030  000000                          0
19086  107032  000000                          0
19087  107034  000000                  3$:     0               ;ERROR RES.
19088  107036  000000                          0
19089  107040  177777                          -1
19090  107042  177777                          -1
19091  107044  047000                  4$:     47000           ;FPS BEFORE EXECUTION.
19092  107046  047004                          47004           ;FPS AFTER EXECUTION.
19093  107050  177777                          -1              ;FEC
19094  107052  147004                          147004          ;ERROR FPS.
19095
19096
19097  107054  004767  000216          XXX2:   JSR     PC,STCFDS
19098  107060  017203                  1$:     17203           ;AC
19099  107062  142536                          142536
19100  107064  047506                          47506
19101  107066  172031                          172031
19102  107070  017203                  2$:     17203           ;RES
19103  107072  142536                          142536
19104  107074  000000                          0
19105  107076  000000                          0
19106  107100  017203                  3$:     17203           ;ERROR RES.
19107  107102  142536                          142536
19108  107104  047506                          47506
19109  107106  172031                          172031
19110  107110  040000                  4$:     40000           ;FPS BEFORE EXECUTION.
19111  107112  040000                          40000           ;FPS AFTER EXECUTION.
19112  107114  177777                          -1              ;FEC
19113  107116  177777                          -1              ;ERROR FPS.
19114
19115
19116  107120  004767  000152          XXX3:   JSR     PC,STCFDS
19117  107124  050717                  1$:     50717           ;AC
19118  107126  027374                          27374
19119  107130  075767                          75767
19120  107132  077071                          77071
19121  107134  050717                  2$:     50717           ;RES
19122  107136  027374                          27374
19123  107140  000000                          0
19124  107142  000000                          0
19125  107144  000000                  3$:     0               ;ERROR RES.
19126  107146  000000                          0
```

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19127  107150  000000                          0
19128  107152  000000                          0
19129  107154  047000                  4$:     47000           ;FPS BEFORE EXECUTION.
19130  107156  047000                          47000           ;FPS AFTER EXECUTION.
19131  107160  177777                          -1              ;FEC
19132  107162  174002                          174002          ;ERROR FPS.
19133
19134
19135  107164  004767  000106          XXX4:   JSR     PC,STCFDS
19136  107170  020212                  1$:     20212           ;AC
19137  107172  032425                          32425
19138  107174  026272                          26272
19139  107176  002123                          02123
19140  107200  020212                  2$:     20212           ;RES
19141  107202  032425                          32425
19142  107204  000000                          0
19143  107206  000000                          0
19144  107210  020212                  3$:     20212           ;ERROR RES.
19145  107212  032425                          32425
19146  107214  100000                          100000
19147  107216  000000                          0
19148  107220  040000                  4$:     40000           ;FPS BEFORE EXECUTION.
19149  107222  040000                          40000           ;FPS AFTER EXECUTION.
19150  107224  177777                          -1              ;FEC
19151  107226  177777                          -1              ;ERROR FPS.
19152
19153
19154  107230  004767  000042          XXX5:   JSR     PC,STCFDS
19155  107234  121314                  1$:     121314          ;AC
19156  107236  151617                          151617
19157  107240  101112                          101112
19158  107242  131415                          131415
19159  107244  121314                  2$:     121314          ;RES
19160  107246  151617                          151617
19161  107250  000000                          0
19162  107252  000000                          0
19163  107254  021314                  3$:     21314           ;ERROR RES.
19164  107256  151617                          151617
19165  107260  000000                          0
19166  107262  000000                          0
19167  107264  040000                  4$:     40000           ;FPS BEFORE EXECUTION.
19168  107266  040010                          40010           ;FPS AFTER EXECUTION.
19169  107270  177777                          -1              ;FEC
19170  107272  177777                          -1              ;ERROR FPS.
19171  107274  000460                  6$:     BR      XXXDONE
19172
19173                                  ;
19174
19175
19176                                  ;THIS SUBROUTINE, STCFDS, IS USED TO SET UP THE OPERANDS, EXECUTE
19177                                  ;THE STCFD INSTRUCTION AND CHECK THE RESULTS. A CALL
19178                                  ;TO IT IS MADE THUS:
19179                                  ;
19180                                  ;               JSR     PC,@#STCFDS
19181                                  ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
19182                                  ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
```

```
19183                                                ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
19184                                                ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
19185                                                ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
19186                                                ;               FEC:    .WORD   X               ;EXPECTED FEC
19187                                                ;               ERFPS:  .WORD   X               ;ERROR FPS.
19188                                                ;               ERR1:   ERROR   X               ;DATA ERROR.
19189                                                ;                       BR      CONT
19190                                                ;               ERR2:   ERROR   X               ;FPS ERROR.
19191                                                ;               CONT:                           ;RETURN ADDRESS
19192                                                ;
19193                                                ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
19194                                                ;THE STCFD INSTRUCTION IS EXECUTED.
19195                                                ;THE RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
19196                                                ;COMPARED WITH FPSA IF THIS TOO IS CORRECT STCFDS RETURNS CONTROL
19197                                                ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD STCFDS
19198                                                ;COMPARE IT TO ERROR FPS. IF THIS MATCHES THEN STCFDS WILL RETURN
19199                                                ;TO THE ERROR CALL AT ERR2, OTHERWISE STCFDS ITSELF
19200                                                ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
19201                                                ;STCFD IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
19202                                                ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
19203                                                ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN STCFDS
19204                                                ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR1. OTHERWISE THE
19205                                                ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND STCFDS WILL
19206                                                ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
19207
19208  107276  012601                               STCFDS: MOV     (SP)+,R1                ;PICK UP THE POINTER TO THE OPERANDS.
19209  107300  012700  000200                               MOV     #200,R0         ;ENTER DOUBLE FLOATING MODE.
19210  107304  170100                                       LDFPS   R0
19211  107306  010100                                       MOV     R1,R0           ;LOAD AC0.
19212  107310  172410                                       LDD     (R0),AC0
19213  107312  012700  177777                               MOV     #-1,R0          ;FILL THE OUTPUT BUFFER WITH -1'S.
19214  107316  012702  107426                               MOV     #STCFT,R2
19215  107322  012703  000004                               MOV     #4,R3
19216  107326  010022                               1$:     MOV     R0,(R2)+
19217  107330  077302                                       SOB     R3,1$
19218  107332  016100  000030                               MOV     30(R1),R0       ;LOAD THE FPS.
19219  107336  170100                                       LDFPS   R0
19220  107340  012700  107426                               MOV     #STCFT,R0       ;SET UP THE DESTINATION ADDRESS.
19221  107344  176010                               2$:     STCFD   AC0,(R0)        ;TEST INSTRUCTION.
19222
19223  107346  170204                                       STFPS   R4              ;GET THE FPS.
19224  107350  170305                                       STST    R5              ;GET THE FEC.
19225  107352  010102                                       MOV     R1,R2           ;CHECK THE RESULT.
19226  107354  062702  000010                               ADD     #10,R2
19227  107360  012703  107426                               MOV     #STCFT,R3
19228  107364  012700  000004                               MOV     #4,R0
19229  107370  022223                               3$:     CMP     (R2)+,(R3)+
19230  107372  001014                                       BNE     10$             ;BRANCH IF INCORRECT.
19231  107374  077003                                       SOB     R0,3$
19232
19233  107376  016102  000032                               MOV     32(R1),R2
19234  107402  020204                                       CMP     R2,R4           ;IS THE FPS CORRECT?
19235  107404  001007                                       BNE     10$             ;BRANCH IF FPS INCORRECT.
19236  107406  005702                                       TST     R2              ;IF EXPECTED FPS IS NEGATIVE, THEN
19237  107410  100003                                       BPL     4$              ;GO AHEAD AND CHECK THE FEC.
19238  107412  026105  000036                               CMP     36(R1),R5
```

```
19239  107416  001002                    BNE     10$             ;BRANCH IF FEC IS INCORRECT.
19240  107420  000161  000040    4$:     JMP     40(R1)          ;RETURN.
19241  107424                    10$:
19242  107424  104000                    EMT                     ;
19243  107426  177777  177777  177777  STCFT:  -1,-1,-1,-1
19244  107434  177777
19245  107436                    XXXDONE:
19246  107436  004767  015130            JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19247                                                            ;SEE IF THE USER HAS EXPRESSED
19248                                                            ;THE DESIRE TO CHANGE THE SOFTWARE
19249                                                            ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19250                                                            ;THE USER TYPED CONTROL G?).
19251
19252                            ;*****************************************************************************
19253                            ;TEST 524       STCDF TEST
19254                            ;*****************************************************************************
19255  107442                    TS524:
19256
19257                            ;AC=0
19258  107442  004767  000262    YYY1:   JSR     PC,STCDFS
19259  107446  000000            1$:     0                       ;AC
19260  107450  000000                    0
19261  107452  000000                    0
19262  107454  000000                    0
19263  107456  000000            2$:     0                       ;RES
19264  107460  000000                    0
19265  107462  177777                    -1
19266  107464  177777                    -1
19267  107466  000000            3$:     0                       ;ERROR RES.
19268  107470  000000                    0
19269  107472  000000                    0
19270  107474  000000                    0
19271  107476  047200            4$:     47200                   ;FPS BEFORE EXECUTION.
19272  107500  047204                    47204                   ;FPS AFTER EXECUTION.
19273  107502  177777                    -1                      ;FEC
19274  107504  177777                    -1                      ;ERROR FPS.
19275
19276
19277  107506  004767  000216    YYY2:   JSR     PC,STCDFS
19278  107512  067574            1$:     67574                   ;AC0
19279  107514  073727                    73727
19280  107516  170777                    170777
19281  107520  067574                    67574
19282  107522  067574            2$:     67574                   ;RES
19283  107524  073730                    73730
19284  107526  177777                    -1
19285  107530  177777                    -1
19286  107532  067574            3$:     67574                   ;ERROR RES.
19287  107534  073727                    73727
19288  107536  177777                    -1
19289  107540  177777                    -1
19290  107542  040200            4$:     40200                   ;FPS BEFORE EXECUTION.
19291  107544  040200                    40200                   ;FPS AFTER EXECUTION.
19292  107546  177777                    -1                      ;FEC
19293  107550  177777                    -1                      ;ERROR FPS.
19294
```

```
19295
19296  107552  004767  000152          YYY3:   JSR     PC,STCDFS
19297  107556  077777                  1$:     77777                   ;AC0
19298  107560  177777                          -1
19299  107562  100000                          100000
19300  107564  000000                          0
19301  107566  000000                  2$:     0                       ;RES
19302  107570  000000                          0
19303  107572  177777                          -1
19304  107574  177777                          -1
19305  107576  077777                  3$:     77777                   ;ERROR RES.
19306  107600  177777                          -1
19307  107602  177777                          -1
19308  107604  177777                          -1
19309  107606  040200                  4$:     40200                   ;FPS BEFORE EXECUTION.
19310  107610  040206                          40206                   ;FPS AFTER EXECUTION.
19311  107612  177777                          -1                      ;FEC
19312  107614  040204                          40204                   ;ERROR FPS.
19313
19314
19315  107616  004767  000106          YYY4:   JSR     PC,STCDFS
19316  107622  077777                  1$:     77777                   ;AC0
19317  107624  177777                          -1
19318  107626  100000                          100000
19319  107630  000000                          0
19320  107632  000000                  2$:     0                       ;RES
19321  107634  000000                          0
19322  107636  177777                          -1
19323  107640  177777                          -1
19324  107642  077777                  3$:     77777                   ;ERROR RES.
19325  107644  177777                          -1
19326  107646  177777                          -1
19327  107650  177777                          -1
19328  107652  040200                  4$:     40200                   ;FPS BEFORE EXECUTION.
19329  107654  040206                          40206                   ;FPS AFTER EXECUTION.
19330  107656  177777                          -1                      ;FEC
19331  107660  140206                          140206                  ;ERROR FPS.
19332
19333
19334  107662  004767  000042          YYY5:   JSR     PC,STCDFS
19335  107666  177777                  1$:     177777                  ;AC0
19336  107670  177777                          -1
19337  107672  100000                          100000
19338  107674  000000                          0
19339  107676  100000                  2$:     100000                  ;RES
19340  107700  000000                          0
19341  107702  177777                          -1
19342  107704  177777                          -1
19343  107706  000000                  3$:     0                       ;ERROR RES.
19344  107710  000000                          0
19345  107712  177777                          -1
19346  107714  177777                          -1
19347  107716  047200                  4$:     47200                   ;FPS BEFORE EXECUTION.
19348  107720  147216                          147216                  ;FPS AFTER EXECUTION.
19349  107722  000010                          10                      ;FEC
19350  107724  047206                          47206                   ;ERROR FPS.
```

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19351  107726  000460                6$:     BR      YYYDONE
19352                                ;THIS SUBROUTINE, STCDFS, IS USED TO SET UP THE OPERANDS, EXECUTE
19353                                ;THE STCDF INSTRUCTION AND CHECK THE RESULTS. A CALL
19354                                ;TO IT IS MADE THUS:
19355                                ;
19356                                ;               JSR     PC,@#STCFDS
19357                                ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
19358                                ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
19359                                ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
19360                                ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
19361                                ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
19362                                ;               FEC:    .WORD   X               ;EXPECTED FEC
19363                                ;               ERFPS:  .WORD   X               ;ERROR FPS.
19364                                ;               ERR1:   ERROR   X               ;DATA ERROR.
19365                                ;                       BR      CONT
19366                                ;               ERR2:   ERROR   X               ;FPS ERROR.
19367                                ;               CONT:                           ;RETURN ADDRESS
19368                                ;
19369                                ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
19370                                ;THE STCFD INSTRUCTION IS EXECUTED.
19371                                ;THE RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
19372                                ;COMPARED WITH FPSA IF THIS TOO IS CORRECT STCFDS RETURNS CONTROL
19373                                ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD STCFDS
19374                                ;COMPARE IT TO ERROR FPS. IF THIS MATCHES THEN STCFDS WILL RETURN
19375                                ;TO THE ERROR CALL AT ERR2, OTHERWISE STCFDS ITSELF
19376                                ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
19377                                ;STCFD IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
19378                                ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
19379                                ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN STCFDS
19380                                ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR1. OTHERWISE THE
19381                                ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND STCFDS WILL
19382                                ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
19383
19384  107730  012601                STCDFS: MOV     (SP)+,R1        ;PICK UP THE POINTER TO THE OPERANDS.
19385  107732  012700  000200              MOV     #200,R0         ;ENTER DOUBLE FLOATING MODE.
19386  107736  170100                      LDFPS   R0
19387  107740  010100                      MOV     R1,R0           ;LOAD AC0.
19388  107742  172410                      LDD     (R0),AC0
19389  107744  012700  177777              MOV     #-1,R0          ;FILL THE OUTPUT BUFFER WITH -1'S.
19390  107750  012702  110060              MOV     #STCDT,R2
19391  107754  012703  000004              MOV     #4,R3
19392  107760  010022                1$:   MOV     R0,(R2)+
19393  107762  077302                      SOB     R3,1$
19394  10  64  016100  000030              MOV     30(R1),R0       ;LOAD THE FPS.
19395  107770  170100                      LDFPS   R0
19396  107772  012700  110060              MOV     #STCDT,R0       ;SET UP THE DESTINATION ADDRESS.
19397  107776  176010                2$:   STCDF   AC0,(R0)        ;TEST INSTRUCTION.
19398
19399  110000  170204                      STFPS   R4              ;GET THE FPS.
19400  110002  170305                      STST    R5              ;GET THE FEC.
19401  110004  010102                      MOV     R1,R2           ;CHECK THE RESULT.
19402  110006  062702  000010              ADD     #10,R2
19403  110012  012703  110060              MOV     #STCDT,R3
19404  110016  012700  000004              MOV     #4,R0
19405  110022  022223                3$:   CMP     (R2)+,(R3)+
19406  110024  001014                      BNE     10$             ;BRANCH IF INCORRECT.
```

```
19407  110026  077003                    SOB     R0,3$
19408
19409  110030  016102  000032            MOV     32(R1),R2
19410  110034  020204                    CMP     R2,R4           ;IS THE FPS CORRECT?
19411  110036  001007                    BNE     10$             ;BRANCH IF FPS INCORRECT.
19412  110040  005702                    TST     R2              ;IF EXPECTED FPS IS NEGATIVE, THEN
19413  110042  100003                    BPL     4$              ;GO AHEAD AND CHECK THE FEC.
19414  110044  026105  000034            CMP     34(R1),R5
19415  110050  001002                    BNE     10$             ;BRANCH IF FEC IS INCORRECT.
19416  110052  000161  000040    4$:     JMP     40(R1)          ;RETURN.
19417  110056                    10$:
19418  110056  104000                    EMT                     ;
19419  110060  177777  177777  177777  STCDT:  -1,-1,-1,-1
19420  110066  177777
19421  110070                    YYYDONE:
19422  110070  004767  014476            JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19423                                                            ;SEE IF THE USER HAS EXPRESSED
19424                                                            ;THE DESIRE TO CHANGE THE SOFTWARE
19425                                                            ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19426                                                            ;THE USER TYPED CONTROL G?).
19427                             ;*******************************************************************************
19428                             ;TEST 525       STCFD WITH ILLEGAL ACCUMULATOR TEST
19429                             ;*******************************************************************************
19430  110074                     TS525:
19431
19432  110074  012700  040000            MOV     #40000,R0       ;DISSABLE INTERRUPTS.
19433  110100  170100                    LDFPS   R0
19434  110102  176006            ZZZ2:   STCFD   AC0,AC6         ;THIS TEST INSTRUCTION SHOULD CAUSE AN ERROR.
19435
19436  110104  170204                    STFPS   R4              ;GET FPS.
19437  110106  170305                    STST    R5              ;GET FEC.
19438  110110  020427  140000            CMP     R4,#140000      ;IS FPS CORRECT?
19439  110114  001004                    BNE     ZZZ10           ;BRANCH IF INCORRECT FPS.
19440  110116  022705  000002            CMP     #2,R5           ;IS FEC CORRECT?
19441  110122  001001                    BNE     ZZZ10           ;BRANCH IF INCORRECT.
19442  110124  000401                    BR      ZZZDONE
19443
19444  110126                    ZZZ10:
19445  110126  104000                    EMT                     ;
19446
19447  110130                    ZZZDONE:
19448  110130  004767  014436            JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19449                                                            ;SEE IF THE USER HAS EXPRESSED
19450                                                            ;THE DESIRE TO CHANGE THE SOFTWARE
19451                                                            ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19452                                                            ;THE USER TYPED CONTROL G?).
19453
19454                             ;*******************************************************************************
19455                             ;TEST 526       CLRD TEST
19456                             ;*******************************************************************************
19457  110134                     TS526:
19458  110134  012700  110240            MOV     #AABTP1,R0      ;SET UP OUTPUT BUFFER
19459  110140  012701  110230            MOV     #AABBF0,R1
19460  110144  012702  000004            MOV     #4,R2
19461  110150  012021            1$:     MOV     (R0)+,(R1)+
19462  110152  077202                    SOB     R2,1$
```

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19463  110154  012700  110230          MOV     #AABBF0,R0      ;SET UP DESTINATION OPERAND ADDRESS.
19464  110160  012701  000213          MOV     #213,R1         ;SET UP FPS.
19465  110164  170101                  LDFPS   R1
19466  110166  170410          2$:     CLRD    (R0)            ;TEST INSTRUCTION.
19467
19468  110170  170205                  STFPS   R5              ;GET FPS.
19469  110172  012702  000004          MOV     #4,R2           ;SEE IF RESULT CLEAR, 0.
19470  110176  012701  110230          MOV     #AABBF0,R1
19471  110202  005721          3$:     TST     (R1)+
19472  110204  001010                  BNE     AAB2            ;BRANCH IF RESULT INCORRECT, NOT 0.
19473  110206  077203                  SOB     R2,3$
19474  110210  022705  000204          CMP     #204,R5         ;SEE IF FPS IS CORRECT.
19475  110214  001004                  BNE     AAB2            ;BRANCH IF INCORRECT.
19476  110216  020027  110230          CMP     R0,#AABBF0      ;SEE IF R0 IS CORRECT.
19477  110222  001001                  BNE     AAB2            ;BRANCH IF R0 IS INCORRECT.
19478  110224  000411                  BR      AABDONE
19479
19480
19481  110226          AAB2:
19482  110226  104000                  EMT                     ;
19483
19484                   ;THIS IS THE TEST DATA BUFFER, OUTPUT DATA BUFFER.
19485  110230  073475  AABBF0: 73475
19486  110232  067707          67707
19487  110234  127347          127347
19488  110236  056770          56770
19489                   ;THIS IS THE DATA USED TO SET UP THE OUTPUT BUFFER.
19490  110240  073475  AABTP1: 73475
19491  110242  067707          67707
19492  110244  127347          127347
19493  110246  056770          56770
19494  1102:0          AABDONE:
19495  110250  004767  014316          JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
19496                                                          ;SEE IF THE USER HAS EXPRESSED
19497                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
19498                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19499                                                          ;THE USER TYPED CONTROL G?).
19500
19501                   ;*****************************************************************************
19502                   ;TEST 527       CLRD WITH ILLEGAL ACCUMULATOR TEST
19503                   ;*****************************************************************************
19504  110254          TS527:
19505  110254  012700  040200          MOV     #40200,R0       ;SET UP THE FPS, NO INTERRUPTS AND FD=1.
19506  110260  170100                  LDFPS   R0
19507  110262  170407          CCB2:   CLRD    AC7             ;TEST INSTRUCTION.
19508
19509  110264  170204                  STFPS   R4              ;GET FPS.
19510  110266  170305                  STST    R5              ;GET FEC.
19511  110270  020427  140200          CMP     R4,#140200              ;IS THE FPS CORRECT?
19512  110274  001004                  BNE     CCB10           ;BRANCH IF FPS IS INCORRECT.
19513  110276  022705  000002          CMP     #2,R5           ;IS THE FEC CORRECT?
19514  110302  001001                  BNE     CCB10           ;BRANCH IF FEC IS INCORRECT.
19515  110304  000401                  BR      CCBDONE
19516
19517  110306          CCB10:
19518  110306  104000                  EMT                     ;
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 19519  110310
 19520  110310  004767  014256          CCBDONE:
                                                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK· AND
 19521                                                                  ;SEE IF THE USER HAS EXPRESSED
 19522                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 19523                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 19524                                                                  ;THE USER TYPED CONTROL G?).
 19525
 19526          ;*****************************************************************************************
 19527          ;TEST 530       NEGF, ABSF AND TSTF SOURCE MODE 0 WITH ILLEGAL AC7, TEST
 19528          ;*****************************************************************************************
 19529  110314  TS530:
 19530
 19531  110314  012700  040200                MOV     #40200,R0               ;SET UP THE FPS, FID=1 AND FD=1.
 19532  110320  170100                        LDFPS   R0
 19533  110322  170707          VVB2:         NEGD    AC7             ;TEST INSTRUCTION.
 19534
 19535  110324  170204                        STFPS   R4              ;GET FPS.
 19536  110326  170305                        STST    R5              ;GET FEC.
 19537
 19538  110330  022704  140200                CMP     #140200,R4              ;IS FPS CORRECT?
 19539  110334  001004                        BNE     VVB10           ;BRANCH IF FPS IS INCORRECT.
 19540  110336  022705  000002                CMP     #2,R5           ;IS FEC CORRECT?
 19541  110342  001001                        BNE     VVB10           ;BRANCH IF FEC IS INCORRECT.
 19542  110344  000401                        BR      VVBDONE
 19543  110346          VVB10:
 19544  110346  104000                        EMT                     ;
 19545
 19546  110350  VVBDONE:
 19547  110350  004767  014216                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
 19548                                                                  ;SEE IF THE USER HAS EXPRESSED
 19549                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 19550                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 19551                                                                  ;THE USER TYPED CONTROL G?).
 19552
 19553          ;*****************************************************************************************
 19554          ;TEST 531       NEGF, ABSF AND TSTF SOURCE MODE 0 TEST
 19555          ;*****************************************************************************************
 19556  110354  TS531:
 19557
 19558  110354  012700  000200                MOV     #200,R0         ;SET FD MODE.
 19559  110360  170100                        LDFPS   R0
 19560  110362  012700  110454                MOV     #DDBTP1,R0      ;SET UP AC0.
 19561  110366  172410                        LDD     (R0),AC0                ;SET AC0 = 0
 19562  110370  005000                        CLR     R0              ;CLEAR THE FPS.
 19563  110372  170100                        LDFPS   R0
 19564  110374  012700  110464                MOV     #DDBTP2,R0              ;LOAD AC0 TO BE A FLOATING 0.
 19565  110400  172410                        LDF     (R0),AC0        ;SET AC0=ZERO
 19566                                                                  ;FLOAT
 19567  110402  012700  000201                MOV     #201,R0         ;SET FD MODE.
 19568  110406  170100                        LDFPS   R0
 19569  110410  170700          DDB2:         NEGD    AC0             ;TEST INSTRUCTION
 19570
 19571  110412  170205                        STFPS   R5              ;GET FPS.
 19572  110414  012700  000200                MOV     #200,R0         ;SET FD MODE.
 19573  110420  170100                        LDFPS   R0
 19574  110422  012700  110474                MOV     #DDBBF0,R0      ;GET THE RESULT OUT OF AC0.
```

```
19575  110426  174010                          STD     AC0,(R0)
19576                                                          ;SEE IF THE RESULT IS CORRECT.
19577  110430  012701  000004                  MOV     #4,R1
19578  110434  005720                  1$:     TST     (R0)+
19579  110436  001005                          BNE     DDB5            ;BRANCH IF THE RESULT IS INCORRECT.
19580  110440  077103                          SOB     R1,1$
19581  110442  022705  000204                  CMP     #204,R5         ;IS THE FPS CORRECT?
19582  110446  001001                          BNE     DDB5            ;BRANCH IF THE FPS IS INCORRECT.
19583  110450  000415                          BR      DDBDONE
19584  110452                          DDB5:
19585  110452  104000                          EMT                     ;
19586
19587                                   ;THESE ARE TEST DATA TABLES AND AN OUTPUT BUFFER.
19588  110454  101112                  DDBTP1: 101112
19589  110456  131415                          131415
19590  110460  161710                          161710
19591  110462  111213                          111213
19592  110464  000000                  DDBTP2: 0
19593  110466  000000                          0
19594  110470  000000                          0
19595  110472  000000                          0
19596
19597  110474  177777                  DDBBF0: -1
19598  110476  177777                          -1
19599  110500  177777                          -1
19600  110502  177777                          -1
19601
19602  110504                          DDBDONE:
19603  110504  004767  014062                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19604                                                                  ;SEE IF THE USER HAS EXPRESSED
19605                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
19606                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19607                                                                  ;THE USER TYPED CONTROL G?).
19608
19609                                   ;*****************************************************************************
19610                                   ;TEST 532       NEGF, ABSF AND TSTF SOURCE MODE 1 TEST
19611                                   ;*****************************************************************************
19612  110510                          TS532:
19613
19614  110510  012700  110610                  MOV     #EEBTP1,R0      ;SET UP THE DATA BUFFER.
19615  110514  012701  110630                  MOV     #EEBBF1,R1
19616  110520  012702  000004                  MOV     #4,R2
19617  110524  012021                  1$:     MOV     (R0)+,(R1)+
19618  110526  077202                          SOB     R2,1$
19619  110530  012700  000200                  MOV     #200,R0         ;SET FD MODE.
19620  110534  170100                          LDFPS   R0
19621  110536  012700  110630                  MOV     #EEBBF1,R0      ;SET UP THE OPERAND ADDRESS.
19622  110542  012737  110640  000004          MOV     #EEB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF ERROR.
19623  110550  170710                  EEB2:   NEGD    (R0)            ;TEST INSTRUCTION.
19624
19625  110552  170205                          STFPS   R5              ;GET FPS.
19626  110554  012701  110630                  MOV     #EEBBF1,R1      ;SEE IF RESULT IS CORRECT.
19627  110560  012702  000004                  MOV     #4,R2
19628  110564  005721                  1$:     TST     (R1)+
19629  110566  001024                          BNE     EEB10           ;BRANCH IF NOT CORRECT.
19630  110570  077203                          SOB     R2,1$
```

```
19631
19632  110572  020027  110630          CMP     R0,#EEBBF1      ;IS R0 CORRECT?
19633  110576  001020                  BNE     EEB10                   ;BRANCH IF NOT CORRECT.
19634  110600  022705  000204          CMP     #204,R5         ;IS THE FPS CORRECT?
19635  110604  001015                  BNE     EEB10           ;BRANCH IF NOT CORRECT.
19636  110606  000415                  BR      EEBDONE
19637
19638                                  ;THESE ARE TEST DATA TABLES AND A BUFFER.
19639  110610  000177                  EEBTP1: 177
19640  110612  167574                          167574
19641  110614  137271                          137271
19642  110616  107675                          107675
19643  110620  177777                  EEBBF0: -1
19644  110622  177777                          -1
19645  110624  177777                          -1
19646  110626  177777                          -1
19647  110630  177777                  EEBBF1: -1
19648  110632  177777                          -1
19649  110634  177777                          -1
19650  110636  177777                          -1
19651  110640                          EEB10:
19652  110640  104000                          EMT                     ;
19653  110642                          EEBDONE:
19654  110642  004767  013724                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19655                                                                  ;SEE IF THE USER HAS EXPRESSED
19656                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
19657                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19658                                                                  ;THE USER TYPED CONTROL G?).
19659
19660                                  ;*****************************************************************************
19661                                  ;TEST 533       NEGF, ABSF AND TSTF SOURCE MODE 2 TEST
19662                                  ;*****************************************************************************
19663  110646                          TS533:
19664
19665  110646  012700  110746                  MOV     #FFBTP1,R0              ;SET UP THE DATA BUFFER.
19666  110652  012701  110756                  MOV     #FFBBF1,R1
19667  110656  012702  000004                  MOV     #4,R2
19668  110662  012021                  1$:     MOV     (R0)+,(R1)+
19669  110664  077202                          SOB     R2,1$
19670  110666  012700  000200                  MOV     #200,R0         ;SET FD.
19671  110672  170100                          LDFPS   R0
19672  110674  012700  110756                  MOV     #FFBBF1,R0      ;SET UP THE OPERAND ADDRESS.
19673  110700  012737  110766  000004          MOV     #FFB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF AN ERROR.
19674
19675  110706  170620                  FFB2:   ABSD    (R0)+           ;TEST INSTRUCTION.
19676
19677  110710  170205                          STFPS   R5              ;GET FPS.
19678  110712  012701  110756                  MOV     #FFBBF1,R1              ;CHECK RESULT.
19679  110716  012702  000004                  MOV     #4,R2
19680  110722  005721                  1$:     TST     (R1)+
19681  110724  001020                          BNE     FFB10           ;BRANCH IF INCORRECT.
19682  110726  077203                          SOB     R2,1$
19683
19684  110730  020027  110766                  CMP     R0,#FFBBF1+10   ;IS R0 CORRECT?
19685  110734  001014                          BNE     FFB10           ;BRANCH IF INCORRECT.
19686  110736  022705  000204                  CMP     #204,R5         ;IS THE FPS CORRECT?
```

```
19687  110742  001011                  BNE     FFB10           ;BRANCH IF INCORRECT.
19688  110744  000411                  BR      FFBDONE
19689
19690                                  ;THESE ARE TEST DATA TABLES AND DATA BUFFER.
19691  110746  000177                  FFBTP1: 177
19692  110750  167574                          167574
19693  110752  137271                          137271
19694  110754  107675                          107675
19695  110756  177777                  FFBBF1: -1
19696  110760  177777                          -1
19697  110762  177777                          -1
19698  110764  177777                          -1
19699  110766                          FFB10:
19700  110766  104000                          EMT                     ;
19701  110770                          FFBDONE:
19702  110770  004767  013576                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
19703                                                                  ;SEE IF THE USER HAS EXPRESSED
19704                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
19705                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19706                                                                  ;THE USER TYPED CONTROL G?).
19707                                  ;*****************************************************************************
19708                                  ;TEST 534       NEGF, ABSF AND TSTF SOURCE MODE 4 TEST
19709                                  ;*****************************************************************************
19710  110774                          TS534:
```

```
19711
19712  110774  012700  111074          MOV     #GGBTP1,R0              ;SET UP THE DATA BUFFER.
19713  111000  012701  111104          MOV     #GGBBF0,R1
19714  111004  012702  000004          MOV     #4,R2
19715  111010  012021          1$:     MOV     (R0)+,(R1)+
19716  111012  077202                  SOB     R2,1$
19717  111014  012700  000200          MOV     #200,R0         ;SET FD.
19718  111020  170100                  LDFPS   R0
19719  111022  012700  111114          MOV     #GGBBF1,R0      ;SET UP THE OPERAND ADDRESS.
19720  111026  012737  111124  000004  MOV     #GGB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF AN ERROR.
19721
19722  111034  170640          GGB2:   ABSD    -(R0)           ;TEST INSTRUCTION.
19723
19724  111036  170205                  STFPS   R5              ;GET FPS.
19725  111040  012701  111104          MOV     #GGBBF0,R1              ;CHECK RESULT.
19726  111044  012702  000004          MOV     #4,R2
19727  111050  005721          1$:     TST     (R1)+
19728  111052  001024                  BNE     GGB10           ;BRANCH IF INCORRECT.
19729  111054  077203                  SOB     R2,1$
19730
19731  111056  020027  111104          CMP     R0,#GGBBF0      ;IS R0 CORRECT?
19732  111062  001020                  BNE     GGB10           ;BRANCH IF INCORRECT.
19733  111064  022705  000204          CMP     #204,R5         ;IS THE FPS CORRECT?
19734  111070  001015                  BNE     GGB10           ;BRANCH IF INCORRECT.
19735  111072  000415                  BR      GGBDONE
19736
19737                          ;THESE ARE TEST DATA TABLES AND DATA BUFFER.
19738  111074  000177          GGBTP1: 177
19739  111076  117273                  117273
19740  111100  147576                  147576
19741  111102  177071                  177071
19742  111104  177777          GGBBF0: -1
19743  111106  177777                  -1
19744  111110  177777                  -1
19745  111112  177777                  -1
19746  111114  177777          GGBBF1: -1
19747  111116  177777                  -1
19748  111120  177777                  -1
19749  111122  177777                  -1
19750  111124                  GGB10:
19751  111124  104000                  EMT                     ;
19752  111126                  GGBDONE:
19753  111126  004767  013440          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19754                                                          ;SEE IF THE USER HAS EXPRESSED
19755                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
19756                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19757                                                          ;THE USER TYPED CONTROL G?).
19758                          ;*****************************************************************************
19759                          ;TEST 535       NEGF, ABSF AND TSTF SOURCE MODE 3 TEST
19760                          ;*****************************************************************************
19761  111132                  TS535:
19762
19763  111132  012700  111232          MOV     #HHBTP1,R0              ;SET UP THE DATA BUFFER.
19764  111136  012701  111252          MOV     #HHBBF0,R1
19765  111142  012702  000010          MOV     #10,R2
19766  111146  012021          1$:     MOV     (R0)+,(R1)+
```

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19767  111150  077202                          SOB     R2,1$
19768  111152  012700  000200                  MOV     #200,R0         ;SET FD.
19769  111156  170100                          LDFPS   R0
19770  111160  012700  111262                  MOV     #HHBBF1,R0      ;SET UP THE OPERAND ADDRESS.
19771  111164  012737  111272  000004          MOV     #HHB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF AN ERROR.
19772
19773  111172  170630                  HHB2:   ABSD    @(R0)+          ;TEST INSTRUCTION.
19774
19775  111174  170205                          STFPS   R5              ;GET FPS.
19776  111176  012701  111252                  MOV     #HHBBF0,R1              ;CHECK RESULT.
19777  111202  012702  000004                  MOV     #4,R2
19778  111206  005721                  1$:     TST     (R1)+
19779  111210  001030                          BNE     HHB10           ;BRANCH IF INCORRECT.
19780  111212  077203                          SOB     R2,1$
19781  111214  020027  111264                  CMP     R0,#HHBBF1+2    ;IS R0 CORRECT?
19782  111220  001024                          BNE     HHB10           ;BRANCH IF INCORRECT.
19783  111222  022705  000204                  CMP     #204,R5         ;IS THE FPS CORRECT?
19784  111226  001021                          BNE     HHB10           ;BRANCH IF INCORRECT.
19785  111230  000421                          BR      HHBDONE
19786
19787                                  ;THESE ARE TEST DATA TABLES AND DATA BUFFER.
19788  111232  000177                  HHBTP1: 177
19789  111234  147576                          147576
19790  111236  177071                          177071
19791  111240  107576  111252  177777          107576,HHBBF0,-1,-1,-1
19792  111246  177777  177777
19793  111252  177777                  HHBBF0: -1
19794  111254  177777                          -1
19795  111256  177777                          -1
19796  111260  177777                          -1
19797  111262  177777                  HHBBF1: -1
19798  111264  177777                          -1
19799  111266  177777                          -1
19800  111270  177777                          -1
19801  111272                          HHB10:
19802  111272  104000                          EMT                     ;
19803  111274                          HHBDONE:
19804  111274  004767  013272                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
19805                                                                  ;SEE IF THE USER HAS EXPRESSED
19806                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
19807                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19808                                                                  ;THE USER TYPED CONTROL G?).
19809                                  ;******************************************************************************
19810                                  ;TEST 536       NEGF, ABSF AND TSTF SOURCE MODE 5 TEST
19811                                  ;******************************************************************************
19812  111300                          TS536:
19813
19814  111300  012700  111400                  MOV     #IIBTP1,R0              ;SET UP THE DATA BUFFER.
19815  111304  012701  111420                  MOV     #IIBBF0,R1
19816  111310  012702  000010                  MOV     #10,R2
19817  111314  012021                  1$:     MOV     (R0)+,(R1)+
19818  111316  077202                          SOB     R2,1$
19819  111320  012700  000200                  MOV     #200,R0         ;SET FD.
19820  111324  170100                          LDFPS   R0
19821  111326  012700  111432                  MOV     #IIBBF1+2,R0    ;SET UP THE OPERAND ADDRESS.
19822  111332  012737  111440  000004          MOV     #IIB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF AN ERROR.
```

```
19823
19824  111340  170750                  IIB2:   NEGD    @-(R0)          ;TEST INSTRUCTION.
19825
19826  111342  170205                          STFPS   R5              ;GET FPS.
19827  111344  012701  111420                  MOV     #IIBBF0,R1              ;CHECK RESULT.
19828  111350  012702  000004                  MOV     #4,R2
19829  111354  005721                  1$:     TST     (R1)+
19830  111356  001030                          BNE     IIB10           ;BRANCH IF INCORRECT.
19831  111360  077203                          SOB     R2,1$
19832  111362  020027  111430                  CMP     R0,#IIBBF1      ;IS R0 CORRECT?
19833  111366  001024                          BNE     IIB10           ;BRANCH IF INCORRECT.
19834  111370  022705  000204                  CMP     #204,R5         ;IS THE FPS CORRECT?
19835  111374  001021                          BNE     IIB10           ;BRANCH IF INCORRECT.
19836  111376  000421                          BR      IIBDONE
19837
19838                                  ;THESE ARE TEST DATA TABLES AND DATA BUFFER.
19839  111400  000176                  IIBTP1: 176
19840  111402  177074                          177074
19841  111404  127374                          127374
19842  111406  157677  111420  177777          157677,IIBBF0,-1,-1,-1
19843  111414  177777  177777
19844  111420  177777                  IIBBF0: -1
19845  111422  177777                          -1
19846  111424  177777                          -1
19847  111426  177777                          -1
19848  111430  177777                  IIBBF1: -1
19849  111432  177777                          -1
19850  111434  177777                          -1
19851  111436  177777                          -1
19852
19853  111440                          IIB10:
19854  111440  104000                          EMT                     ;
19855  111442                          IIBDONE:
19856  111442  004767  013124                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19857                                                                  ;SEE IF THE USER HAS EXPRESSED
19858                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
19859                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19860                                                                  ;THE USER TYPED CONTROL G?).
19861                                  ;*****************************************************************************
19862                                  ;TEST 537       NEGF, ABSF AND TSTF SOURCE MODE 6 TEST
19863                                  ;*****************************************************************************
19864  111446                          TS537:
19865
19866  111446  012700  111550                  MOV     #JJBTP1,R0              ;SET UP THE DATA BUFFER.
19867  111452  012701  111562                  MOV     #JJBBF0,R1
19868  111456  012702  000004                  MOV     #4,R2
19869  111462  012021                  1$:     MOV     (R0)+,(R1)+
19870  111464  077202                          SOB     R2,1$
19871  111466  012700  000200                  MOV     #200,R0         ;SET FD.
19872  111472  170100                          LDFPS   R0
19873  111474  012700  111553                  MOV     #JJBBF0-7,R0    ;SET UP THE OPERAND ADDRESS.
19874  111500  012737  111572  000004          MOV     #JJB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF AN ERROR.
19875
19876  111506  170660  000007          JJB2:   ABSD    7(R0)           ;TEST INSTRUCTION.
19877
19878  111512  170205                          STFPS   R5              ;GET FPS.
```

```
 19879  111514  012701  111562          MOV     #JJBBF0,R1              ;CHECK RESULT.
 19880  111520  012702  000004          MOV     #4,R2
 19881  111524  005721                  1$:     TST     (R1)+
 19882  111526  001021                          BNE     JJB10           ;BRANCH IF INCORRECT.
 19883  111530  077203                          SOB     R2,1$
 19884  111532  020027  111553          CMP     R0,#JJBBF0-7    ;IS R0 CORRECT?
 19885  111536  001015                  BNE     JJB10           ;BRANCH IF INCORRECT.
 19886  111540  022705  000204          CMP     #204,R5         ;IS THE FPS CORRECT?
 19887  111544  001012                  BNE     JJB10           ;BRANCH IF INCORRECT.
 19888  111546  000412                  BR      JJBDONE
 19889
 19890                                  ;THESE ARE TEST DATA TABLES AND DATA BUFFER.
 19891  111550  000177                  JJBTP1: 177
 19892  111552  161524                          161524
 19893  111554  131273                          131273
 19894  111556  107174  000000                  107174,
 19895  111562  177777                  JJBBF0: -1
 19896  111564  177777                          -1
 19897  111566  177777                          -1
 19898  111570  177777                          -1
 19899  111572                          JJB10:
 19900  111572  104000                  EMT                     ;
 19901  111574                          JJBDONE:
 19902  111574  004767  012772          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
 19903                                                          ;SEE IF THE USER HAS EXPRESSED
 19904                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
 19905                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 19906                                                          ;THE USER TYPED CONTROL G?).
 19907                                  ;*****************************************************************************
 19908                                  ;TEST 540       NEGF, ABSF AND TSTF SOURCE MODE 7 TEST
 19909                                  ;*****************************************************************************
 19910  111600                          TS540:
 19911
 19912  111600  012700  111702                  MOV     #KKBTP1,R0              ;SET UP THE DATA BUFFER.
 19913  111604  012701  111722                  MOV     #KKBBF0,R1
 19914  111610  012702  000010                  MOV     #10,R2
 19915  111614  012021                  1$:     MOV     (R0)+,(R1)+
 19916  111616  077202                          SOB     R2,1$
 19917  111620  012700  000200                  MOV     #200,R0         ;SET FD.
 19918  111624  170100                          LDFPS   R0
 19919  111626  012700  111723                  MOV     #KKBBF1-7,R0    ;SET UP THE OPERAND ADDRESS.
 19920  111632  012737  111742  000004          MOV     #KKB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF AN ERROR.
 19921
 19922  111640  170770  000007          KKB2:   NEGD    @7(R0)          ;TEST INSTRUCTION.
 19923
 19924  111644  170205                          STFPS   R5              ;GET FPS.
 19925  111646  012701  111722                  MOV     #KKBBF0,R1              ;CHECK RESULT.
 19926  111652  012702  000004                  MOV     #4,R2
 19927  111656  005721                  1$:     TST     (R1)+
 19928  111660  001030                          BNE     KKB10           ;BRANCH IF INCORRECT.
 19929  111662  077203                          SOB     R2,1$
 19930  111664  020027  111723                  CMP     R0,#KKBBF1-7    ;IS R0 CORRECT?
 19931  111670  001024                          BNE     KKB10           ;BRANCH IF INCORRECT.
 19932  111672  022705  000204                  CMP     #204,R5         ;IS THE FPS CORRECT?
 19933  111676  001021                          BNE     KKB10           ;BRANCH IF INCORRECT.
 19934  111700  000421                          BR      KKBDONE
```

```
19935
19936                                   ;THESE ARE TEST DATA TABLES AND DATA BUFFER.
19937  111702  000177                  KKBTP1: 177
19938  111704  167574                          167574
19939  111706  137271                          137271
19940  111710  107675  111722  177777         107675,KKBBF0,-1,-1,-1
19941  111716  177777  177777
19942  111722  177777                  KKBBF0: -1
19943  111724  177777                          -1
19944  111726  177777                          -1
19945  111730  177777                          -1
19946  111732  177777                  KKBBF1: -1
19947  111734  177777                          -1
19948  111736  177777                          -1
19949  111740  177777                          -1
19950  111742                          KKB10:
19951  111742  104000                          EMT                     ;
19952  111744                          KKBDONE:
19953  111744  004767  012622                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
19954                                                                  ;SEE IF THE USER HAS EXPRESSED
19955                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
19956                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
19957                                                                  ;THE USER TYPED CONTROL G?).
19958                                   ;*****************************************************************************
19959                                   ;TEST 541       NEGF, ABSF AND TSTF SOURCE MODE 6, GR7, TEST
19960                                   ;*****************************************************************************
19961  111750                          TS541:
19962  111750  012700  112040                  MOV     #LLBTP1,R0              ;SET UP THE DATA BUFFER.
19963  111754  012701  112050                  MOV     #LLBBF0,R1
19964  111760  012702  000004                  MOV     #4,R2
19965  111764  012021                  1$:     MOV     (R0)+,(R1)+
19966  111766  077202                          SOB     R2,1$
19967  111770  012700  000200                  MOV     #200,R0         ;SET FD.
19968  111774  170100                          LDFPS   R0
19969  111776  012737  112060  000004          MOV     #LLB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF AN ERROR.
19970
19971  112004  170767  000040          LLB2:   NEGD    LLBBF0          ;TEST INSTRUCTION.
19972
19973  112010  170205                          STFPS   R5              ;GET FPS.
19974  112012  012701  112050                  MOV     #LLBBF0,R1              ;CHECK RESULT.
19975  112016  012702  000004                  MOV     #4,R2
19976  112022  005721                  1$:     TST     (R1)+
19977  112024  001015                          BNE     LLB10           ;BRANCH IF INCORRECT.
19978  112026  077203                          SOB     R2,1$
19979  112030  022705  000204                  CMP     #204,R5         ;IS THE FPS CORRECT?
19980  112034  001011                          BNE     LLB10           ;BRANCH IF INCORRECT.
19981  112036  000411                          BR      LLBDONE
19982
19983                                   ;THESE ARE TEST DATA TABLES AND DATA BUFFER.
19984  112040  000127                  LLBTP1: 127
19985  112042  137475                          137475
19986  112044  147372                          147372
19987  112046  117057                          117057
19988  112050  177777                  LLBBF0: -1
19989  112052  177777                          -1
19990  112054  177777                          -1
```

```
 19991  112056  177777                        -1
 19992
 19993  112060                          LLB10:
 19994  112060  104000                          EMT                     ;
 19995  112062                          LLBDONE:
 19996  112062  004767  012504                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
 19997                                                                  ;SEE IF THE USER HAS EXPRESSED
 19998                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 19999                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 20000                                                                  ;THE USER TYPED CONTROL G?).
 20001                          ;*****************************************************************************
 20002                          ;TEST 542       NEGF, ABSF AND TSTF SOURCE MODE 7, GR7, TEST
 20003                          ;*****************************************************************************
 20004  112066                  TS542:
 20005
 20006  112066  012700  112156                  MOV     #MMBTP1,R0              ;SET UP THE DATA BUFFER.
 20007  112072  012701  112176                  MOV     #MMBBF0,R1
 20008  112076  012702  000010                  MOV     #10,R2
 20009  112102  012021                  1$:     MOV     (R0)+,(R1)+
 20010  112104  077202                          SOB     R2,1$
 20011  112106  012700  000200                  MOV     #200,R0         ;SET FD.
 20012  112112  170100                          LDFPS   R0
 20013  112114  012737  112216  000004          MOV     #MMB10,@#ERRVECT ;SET UP VECTOR 4 IN CASE OF AN ERROR.
 20014
 20015  112122  170677  000060          MMB2:   ABSD    @MMBBF1         ;TEST INSTRUCTION.
 20016
 20017  112126  170205                          STFPS   R5              ;GET FPS.
 20018  112130  012701  112176                  MOV     #MMBBF0,R1              ;CHECK RESULT.
 20019  112134  012702  000004                  MOV     #4,R2
 20020  112140  005721                  1$:     TST     (R1)+
 20021  112142  001025                          BNE     MMB10           ;BRANCH IF INCORRECT.
 20022  112144  077203                          SOB     R2,1$
 20023  112146  022705  000204                  CMP     #204,R5         ;IS THE FPS CORRECT?
 20024  112152  001021                          BNE     MMB10           ;BRANCH IF INCORRECT.
 20025  112154  000421                          BR      MMBDONE
 20026
 20027                                  ;THESE ARE TEST DATA TABLES AND DATA BUFFER.
 20028  112156  000137                  MMBTP1: 137
 20029  112160  045607                          045607
 20030  112162  101230                          101230
 20031  112164  045607  112176  177777          45607,MMBBF0,-1,-1,-1
 20032  112172  177777  177777
 20033  112176  177777                  MMBBF0: -1
 20034  112200  177777                          -1
 20035  112202  177777                          -1
 20036  112204  177777                          -1
 20037  112206  177777                  MMBBF1: -1
 20038  112210  177777                          -1
 20039  112212  177777                          -1
 20040  112214  177777                          -1
 20041
 20042  112216                          MMB10:
 20043  112216  104000                          EMT                     ;
 20044  112220                          MMBDONE:
 20045  112220  004767  012346                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
 20046                                                                  ;SEE IF THE USER HAS EXPRESSED
```

```
20047                                           ;THE DESIRE TO CHANGE THE SOFTWARE
20048                                           ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20049                                           ;THE USER TYPED CONTROL G?).
20050                   ;*******************************************************************************
20051                   ;TEST 543       SPECIAL DEST, MODE 0, TEST
20052                   ;*******************************************************************************
20053   112224          TS543:
20054
20055   112224  012700  000200          MOV     #200,R0         ;SET FD.
20056   112230  170100                  LDFPS   R0
20057   112232  012700  112312          MOV     #NNBTP1,R0              ;SET UP AC0.
20058   112236  172410                  LDD     (R0),AC0
20059   112240  170700          NNB2:   NEGD    AC0             ;TEST INSTRUCTION.
20060
20061   112242  170205                  STFPS   R5              ;GET FPS.
20062   112244  012700  000200          MOV     #200,R0         ;SET FD.
20063   112250  170100                  LDFPS   R0
20064   112252  012700  112332          MOV     #NNBBF0,R0              ;GET THE RESULT.
20065   112256  174010                  STD     AC0,(R0)
20066   112260  012700  112332          MOV     #NNBBF0,R0              ;IS THE RESULT CORRECT?
20067   112264  012701  112322          MOV     #NNBTP2,R1
20068   112270  012702  000004          MOV     #4,R2
20069   112274  022021          1$:     CMP     (R0)+,(R1)+
20070   112276  001021                  BNE     NNB10           ;BRANCH IF INCORRECT.
20071   112300  077203                  SOB     R2,1$
20072   112302  012705  000210          CMP     #210,R5         ;IS THE FPS CORRECT?
20073   112306  001015                  BNE     NNB10           ;BRANCH IF INCORRECT.
20074   112310  000415                  BR      NNBDONE
20075
20076                                   ;THESE ARE DATA TABLES AND A DATA BUFFER.
20077   112312  013572          NNBTP1: 013572
20078   112314  046013                  46013
20079   112316  057246                  57246
20080   112320  013570                  013570
20081   112322  113572          NNBTP2: 113572
20082   112324  046013                  46013
20083   112326  057246                  57246
20084   112330  013570                  013570
20085   112332  000000          NNBBF0: 0
20086   112334  000000                  0
20087   112336  000000                  0
20088   112340  000000                  0
20089
20090   112342                  NNB10:
20091   112342  104000                  EMT                     ;
20092   112344                  NNBDONE:
20093   112344  004767  012222          JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
20094                                                           ;SEE IF THE USER HAS EXPRESSED
20095                                                           ;THE DESIRE TO CHANGE THE SOFTWARE
20096                                                           ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20097                                                           ;THE USER TYPED CONTROL G?).
20098                   ;*******************************************************************************
20099                   ;TEST 544       SPECIAL DEST, MODE 1, TEST
20100                   ;*******************************************************************************
20101   112350          TS544:
20102
```

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20103   112350  012701  112452          MOV     #00BTP1,R1      ;SET UP THE DATA BUFFER.
20104   112354  012700  112462          MOV     #00BTP2,R0
20105   112360  012702  000004          MOV     #4,R2
20106   112364  012021          1$:     MOV     (R0)+,(R1)+
20107   112366  077202                  SOB     R2,1$
20108   112370  012700  112452          MOV     #00BTP1,R0
20109   112374  042710  100000          BIC     #100000,(R0)    ;MAKE OPERAND POSITIVE.
20110   112400  012701  000200          MOV     #200,R1         ;SET FD.
20111   112404  170101                  LDFPS   R1
20112
20113   112406  170710          00B2:   NEGD    (R0)            ;TEST INSTRUCTION.
20114   112410  170205                  STFPS   R5              ;GET FPS.
20115   112412  012701  112452          MOV     #00BTP1,R1              ;IS THE RESULT CORRECT.
20116   112416  012702  112462          MOV     #00BTP2,R2
20117   112422  012703  000004          MOV     #4,R3
20118   112426  022122          1$:     CMP     (R1)+,(R2)+
20119   112430  001020                  BNE     00B10           ;BRANCH IF INCORRECT.
20120   112432  077303                  SOB     R3,1$
20121   112434  022700  112452          CMP     #00BTP1,R0      ;IS R0 CORRECT.
20122   112440  001014                  BNE     00B10           ;BRANCH IF INCORRECT.
20123   112442  022705  000210          CMP     #210,R5         ;IS THE FPS CORRECT?
20124   112446  001011                  BNE     00B10           ;BRANCH IF INCORRECT.
20125   112450  000411                  BR      00BDONE
20126
20127                           ;THESE ARE DATA TABLES AND A DATA BUFFER.
20128   112452  023245          00BTP1: 023245
20129   112454  026720                  26720
20130   112456  122324                  122324
20131   112460  052672                  52672
20132   112462  123245          00BTP2: 123245
20133   112464  026720                  26720
20134   112466  122324                  122324
20135   112470  052672                  52672
20136
20137   112472                  00B10:
20138   112472  104000                  EMT                     ;
20139   112474                  00BDONE:
20140   112474  004767  012072          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20141                                                           ;SEE IF THE USER HAS EXPRESSED
20142                                                           ;THE DESIRE TO CHANGE THE SOFTWARE
20143                                                           ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20144                                                           ;THE USER TYPED CONTROL G?).
20145                   ;*****************************************************************************
20146                   ;TEST 545       SPECIAL DEST, MODE 2, TEST
20147                   ;*****************************************************************************
20148   112500          TS545:
20149
20150   112500  012701  112602          MOV     #PPBTP1,R1      ;SET UP THE DATA BUFFER.
20151   112504  012700  112612          MOV     #PPBTP2,R0
20152   112510  012702  000004          MOV     #4,R2
20153   112514  012021          1$:     MOV     (R0)+,(R1)+
20154   112516  077202                  SOB     R2,1$
20155   112520  012700  112602          MOV     #PPBTP1,R0
20156   112524  042710  100000          BIC     #100000,(R0)    ;MAKE OPERAND POSITIVE.
20157   112530  012701  000200          MOV     #200,R1         ;SET FD.
20158   112534  170101                  LDFPS   R1
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20159
20160  112536  170720                  PPB2:   NEGD    (R0)+           ;TEST INSTRUCTION.
20161
20162  112540  170205                          STFPS   R5              ;GET FPS.
20163  112542  012701  112602                  MOV     #PPBTP1,R1              ;IS THE RESULT CORRECT.
20164  112546  012702  112612                  MOV     #PPBTP2,R2
20165  112552  012703  000004                  MOV     #4,R3
20166  112556  022122                  1$:     CMP     (R1)+,(R2)+
20167  112560  001020                          BNE     PPB10           ;BRANCH IF INCORRECT.
20168  112562  077303                          SOB     R3,1$
20169  112564  022700  112612                  CMP     #PPBTP1+10,R0   ;IS R0 CORRECT.
20170  112570  001014                          BNE     PPB10           ;BRANCH IF INCORRECT.
20171  112572  022705  000210                  CMP     #210,R5         ;IS THE FPS CORRECT?
20172  112576  001011                          BNE     PPB10           ;BRANCH IF INCORRECT.
20173  112600  000411                          BR      PPBDONE
20174
20175                                  ;THESE ARE DATA TABLES AND A DATA BUFFER.
20176  112602  023245                  PPBTP1: 023245
20177  112604  026720                          26720
20178  112606  122324                          122324
20179  112610  052672                          52672
20180  112612  123245                  PPBTP2: 123245
20181  112614  026720                          26720
20182  112616  122324                          122324
20183  112620  052672                          52672
20184
20185  112622                          PPB10:
20186  112622  104000                          EMT                     ;
20187  112624                          PPBDONE:
20188  112624  004767  011742                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20189                                                                  ;SEE IF THE USER HAS EXPRESSED
20190                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20191                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20192                                                                  ;THE USER TYPED CONTROL G?).
20193                                  ;*****************************************************************************
20194                                  ;TEST 546       SPECIAL DEST, MODE 4, TEST
20195                                  ;*****************************************************************************
20196  112630                          TS546:
20197  112630  012701  112734                  MOV     #QQBTP1,R1      ;SET UP THE DATA BUFFER.
20198  112634  012700  112754                  MOV     #QQBTP2,R0
20199  112640  012702  000004                  MOV     #4,R2
20200  112644  012021                  1$:     MOV     (R0)+,(R1)+
20201  112646  077202                          SOB     R2,1$
20202  112650  012700  112744                  MOV     #QQBTP1+10,R0
20203  112654  042760  100000  177770          BIC     #100000,-10(R0) ;MAKE OPERAND POSITIVE.
20204  112662  012701  000200                  MOV     #200,R1         ;SET FD.
20205  112666  170101                          LDFPS   R1
20206
20207  112670  170740                  QQB2:   NEGD    -(R0)           ;TEST INSTRUCTION.
20208
20209  112672  170205                          STFPS   R5              ;GET FPS.
20210  112674  012701  112734                  MOV     #QQBTP1,R1              ;IS THE RESULT CORRECT.
20211  112700  012702  112754                  MOV     #QQBTP2,R2
20212  112704  012703  000004                  MOV     #4,R3
20213  112710  022122                  1$:     CMP     (R1)+,(R2)+
20214  112712  001024                          BNE     QQB10           ;BRANCH IF INCORRECT.
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20215  112714  077303                          SOB     R3,1$
20216  112716  022700  112734                  CMP     #QQBTP1,R0      ;IS R0 CORRECT.
20217  112722  001020                          BNE     QQB10           ;BRANCH IF INCORRECT.
20218  112724  022705  000210                  CMP     #210,R5         ;IS THE FPS CORRECT?
20219  112730  001015                          BNE     QQB10           ;BRANCH IF INCORRECT.
20220  112732  000415                          BR      QQBDONE
20221
20222                                  ;THESE ARE DATA TABLES AND A DATA BUFFER.
20223  112734  023245                  QQBTP1: 023245
20224  112736  026720                          26720
20225  112740  122324                          122324
20226  112742  052672                          52672
20227  112744  177777  177777  177777        .WORD   -1,-1,-1,-1
20228  112752  177777
20229  112754  123245                  QQBTP2: 123245
20230  112756  026720                          26720
20231  112760  122324                          122324
20232  112762  052672                          52672
20233
20234  112764                          QQB10:
20235  112764  104000                          EMT                     ;
20236  112766                          QQBDONE:
20237  112766  004767  011600                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20238                                                                  ;SEE IF THE USER HAS EXPRESSED
20239                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20240                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20241                                                                  ;THE USER TYPED CONTROL G?).
20242
20243                                  ;*********************************************************************************
20244                                  ;TEST 547       SPECIAL DEST, MODE 3, TEST
20245                                  ;*********************************************************************************
20246  112772                          TS547:
20247
20248  112772  012701  113102                          MOV     #RRBTP1,R1      ;SET UP THE DATA BUFFER.
20249  112776  012700  113112                          MOV     #RRBTP2,R0
20250  113002  012702  000004                          MOV     #4,R2
20251  113006  012021                  1$:             MOV     (R0)+,(R1)+
20252  113010  077202                                  SOB     R2,1$
20253  113012  012700  113122                          MOV     #RRBTP3,R0
20254  113016  012710  113102                          MOV     #RRBTP1,(R0)
20255  113022  042737  100000  113102                  BIC     #100000,@#RRBTP1        ;MAKE THE OPERAND POSITIVE.
20256  113030  012701  000200                          MOV     #200,R1         ;SET FD.
20257  113034  170101                                  LDFPS   R1
20258
20259  113036  170730                  RRB2:           NEGD    @(R0)+          ;TEST INSTRUCTION.
20260
20261  113040  170205                                  STFPS   R5              ;GET FPS.
20262  113042  012701  113102                          MOV     #RRBTP1,R1              ;IS THE RESULT CORRECT.
20263  113046  012702  113112                          MOV     #RRBTP2,R2
20264  113052  012703  000004                          MOV     #4,R3
20265  113056  022122                  1$:             CMP     (R1)+,(R2)+
20266  113060  001021                                  BNE     RRB10           ;BRANCH IF INCORRECT.
20267  113062  077303                                  SOB     R3,1$
20268  113064  022700  113124                          CMP     #RRBTP3+2,R0    ;IS R0 CORRECT.
20269  113070  001015                                  BNE     RRB10           ;BRANCH IF INCORRECT.
20270  113072  022705  000210                          CMP     #210,R5         ;IS THE FPS CORRECT?
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20271  113076  001012                          BNE     RRB10           ;BRANCH IF INCORRECT.
20272  113100  000412                          BR      RRBDONE
20273
20274                                          ;THESE ARE DATA TABLES AND A DATA BUFFER.
20275  113102  023245                  RRBTP1: 023245
20276  113104  026720                          26720
20277  113106  122324                          122324
20278  113110  052672                          52672
20279  113112  123245                  RRBTP2: 123245
20280  113114  026720                          26720
20281  113116  123324                          123324
20282  113120  052672                          52672
20283  113122  113102                  RRBTP3: RRBTP1
20284
20285  113124                          RRB10:
20286  113124  104000                          EMT                     ;
20287  113126                          RRBDONE:
20288  113126  004767  011440                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20289                                                                  ;SEE IF THE USER HAS EXPRESSED
20290                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20291                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20292                                                                  ;THE USER TYPED CONTROL G?).
20293
20294                                          ;*****************************************************************************
20295                                          ;TEST 550       SPECIAL DEST, MODE 5, TEST
20296                                          ;*****************************************************************************
20297  113132                          TS550:
20298  113132  012701  113244                  MOV     #SSBTP1,R1      ;SET UP THE DATA BUFFER.
20299  113136  012700  113254                  MOV     #SSBTP2,R0
20300  113142  012702  000004                  MOV     #4,R2
20301  113146  012021                  1$:     MOV     (R0)+,(R1)+
20302  113150  077202                          SOB     R2,1$
20303  113152  012700  113266                  MOV     #SSBTP3+2,R0
20304  113156  012760  113244  177776          MOV     #SSBTP1,-2(R0)
20305  113164  042737  100000  113244          BIC     #100000,@#SSBTP1        ;MAKE THE OPERAND POSITIVE.
20306  113172  012701  000200                  MOV     #200,R1         ;SET FD.
20307  113176  170101                          LDFPS   R1
20308
20309  113200  170750                  SSB2:   NEGD    @-(R0)          ;TEST INSTRUCTION.
20310
20311  113202  170205                          STFPS   R5              ;GET FPS.
20312  113204  012701  113244                  MOV     #SSBTP1,R1              ;IS THE RESULT CORRECT.
20313  113210  012702  113254                  MOV     #SSBTP2,R2
20314  113214  012703  000004                  MOV     #4,R3
20315  113220  022122                  1$:     CMP     (R1)+,(R2)+
20316  113222  001021                          BNE     SSB10           ;BRANCH IF INCORRECT.
20317  113224  077303                          SOB     R3,1$
20318  113226  022700  113264                  CMP     #SSBTP3,R0      ;IS R0 CORRECT.
20319  113232  001015                          BNE     SSB10           ;BRANCH IF INCORRECT.
20320  113234  022705  000210                  CMP     #210,R5         ;IS THE FPS CORRECT?
20321  113240  001012                          BNE     SSB10           ;BRANCH IF INCORRECT.
20322  113242  000412                          BR      SSBDONE
20323
20324                                          ;THESE ARE DATA TABLES AND A DATA BUFFER.
20325  113244  023245                  SSBTP1: 023245
20326  113246  026720                          26720
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20327  113250  122324                  122324
20328  113252  052672                  52672
20329  113254  123245          SSBTP2: 123245
20330  113256  026270                  26270
20331  113260  122324                  122324
20332  113262  052672                  52672
20333  113264  113244          SSBTP3: SSBTP1
20334
20335  113266                  SSB10:
20336  113266  104000                  EMT                     ;
20337  113270                  SSBDONE:
20338  113270  004767  011276          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20339                                                          ;SEE IF THE USER HAS EXPRESSED
20340                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
20341                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20342                                                          ;THE USER TYPED CONTROL G?).
20343          ;*****************************************************************************************
20344          ;TEST 551       SPECIAL DEST, FLOATING MODE 2, TEST
20345          ;*****************************************************************************************
20346  113274                  TS551:
20347  113274  012701  113376          MOV     #TTBTP1,R1      ;SET UP THE DATA BUFFER.
20348  113300  012700  113406          MOV     #TTBTP2,R0
20349  113304  012702  000004          MOV     #4,R2
20350  113310  012021          1$:     MOV     (R0)+,(R1)+
20351  113312  077202                  SOB     R2,1$
20352  113314  012700  113376          MOV     #TTBTP1,R0
20353  113320  042710  100000          BIC     #100000,(R0)    ;MAKE OPERAND POSITIVE.
20354  113324  012701  000000          MOV     #000,R1         ;SET FD.
20355  113330  170101                  LDFPS   R1
20356
20357  113332  170720          TTB2:   NEGF    (R0)+           ;TEST INSTRUCTION.
20358
20359  113334  170205                  STFPS   R5              ;GET FPS.
20360  113336  012701  113376          MOV     #TTBTP1,R1              ;IS THE RESULT CORRECT.
20361  113342  012702  113406          MOV     #TTBTP2,R2
20362  113346  012703  000004          MOV     #4,R3
20363  113352  022122          1$:     CMP     (R1)+,(R2)+
20364  113354  001020                  BNE     TTB10           ;BRANCH IF INCORRECT.
20365  113356  077303                  SOB     R3,1$
20366  113360  022700  113402          CMP     #TTBTP1+4,R0    ;IS R0 CORRECT.
20367  113364  001014                  BNE     TTB10           ;BRANCH IF INCORRECT.
20368  113366  022705  000010          CMP     #010,R5         ;IS THE FPS CORRECT?
20369  113372  001011                  BNE     TTB10           ;BRANCH IF INCORRECT.
20370  113374  000411                  BR      TTBDONE
20371
20372                                  ;THESE ARE DATA TABLES AND A DATA BUFFER.
20373  113376  023245          TTBTP1: 023245
20374  113400  026720                  26720
20375  113402  122324                  122324
20376  113404  052672                  52672
20377  113406  123245          TTBTP2: 123245
20378  113410  026720                  26720
20379  113412  122324                  122324
20380  113414  052672                  52672
20381
20382  113416                  TTB10:
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20383  113416  104000                          EMT                     ;
20384  113420                          TTBDONE:
20385  113420  004767  011146                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20386                                                                  ;SEE IF THE USER HAS EXPRESSED
20387                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20388                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20389                                                                  ;THE USER TYPED CONTROL G?).
20390                          ;*****************************************************************************
20391                          ;TEST 552       SPECIAL DEST, MODE2, GR7 (IMMEDIATE), TEST
20392                          ;*****************************************************************************
20393  113424                  TS552:
20394  113424  012700  113542                  MOV     #UUBTP2,R0
20395  113430  012701  113470                  MOV     #UUBTP1,R1      ;SET UP THE DATA BUFFER.
20396  113434  012702  000004                  MOV     #4,R2
20397  113440  012021                  1$:     MOV     (R0)+,(R1)+
20398  113442  077202                          SOB     R2,1$
20399  113444  012700  113470                  MOV     #UUBTP1,R0
20400  113450  042737  100000  113470          BIC     #100000,@#UUBTP1        ;MAKE THE OPERAND POSITIVE.
20401  113456  012701  000200                  MOV     #200,R1         ;SET FD.
20402  113462  170101                          LDFPS   R1
20403  113464  005001                          CLR     R1
20404
20405  113466  170727                  UUB2:   NEGD    (R7)+           ;TEST INSTRUCTION.
20406  113470  005201  005201  005201  UUBTP1: 5201,5201,5201,5201
20407  113476  005201
20408                                  ;NOTE THAT AFTER EXECUTING THIS INSTRUCTION R1 SHOULD CONTAIN 3.
20409  113500  170205                          STFPS   R5              ;GET FPS.
20410  113502  012703  113470                  MOV     #UUBTP1,R3      ;IS THE RESULT CORRECT.
20411  113506  012702  113542                  MOV     #UUBTP2,R2
20412  113512  012704  000004                  MOV     #4,R4
20413  113516  022232                  1$:     CMP     (R3)+,(R2)+
20414  113520  001014                          BNE     UUB10           ;BRANCH IF INCORRECT.
20415  113522  077403                          SOB     R4,1$
20416  113524  022701  000003                  CMP     #3,R1           ;WAS R1 INCREMENTED CORRECTLY.
20417  113530  001010                          BNE     UUB10           ;BRANCH IF INCORRECT.
20418  113532  022705  000210                  CMP     #210,R5         ;IS THE FPS CORRECT?
20419  113536  001005                          BNE     UUB10           ;BRANCH IF INCORRECT.
20420  113540  000405                          BR      UUBDONE
20421
20422                                  ;THESE ARE DATA TABLE.
20423  113542  105201                  UUBTP2: 105201
20424  113544  005201                          5201
20425  113546  005201                          5201
20426  113550  005201                          5201
20427
20428  113552                          UUB10:
20429  113552  104000                          EMT                     ;
20430  113554                          UUBDONE:
20431  113554  004767  011012                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20432                                                                  ;SEE IF THE USER HAS EXPRESSED
20433                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20434                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20435                                                                  ;THE USER TYPED CONTROL G?).
20436                          ;*****************************************************************************
20437                          ;TEST 553       SPECIAL DEST, MODE 6, TEST
20438                          ;*****************************************************************************
```

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20439  113560                          TS553:
20440  113560  012701  113674                  MOV     #XXBTP1,R1      ;SET UP THE DATA BUFFER.
20441  113564  012700  113704                  MOV     #XXBTP2,R0
20442  113570  012702  000004                  MOV     #4,R2
20443  113574  012021                  1$:     MOV     (R0)+,(R1)+
20444  113576  077202                          SOB     R2,1$
20445  113600  012700  106473                  MOV     #XXBTP1-5201,R0
20446  113604  042737  100000  113674          BIC     #100000,@#XXBTP1;MAKE OPERAND POSITIVE.
20447  113612  012701  000200                  MOV     #200,R1         ;SET FD.
20448  113616  170101                          LDFPS   R1
20449
20450  113620  005001                          CLR     R1
20451  113622  170760  005201          XXB2:   NEGD    5201(R0)                ;TEST INSTRUCTION.
20452
20453  113626  170205                          STFPS   R5              ;GET FPS.
20454  113630  005701                          TST     R1
20455  113632  001030                          BNE     XXB10           ;WAS THE PC CORRECT AFTER EXECUTION?
20456  113634  012701  113674                  MOV     #XXBTP1,R1              ;IS THE RESULT CORRECT.
20457  113640  012702  113704                  MOV     #XXBTP2,R2
20458  113644  012703  000004                  MOV     #4,R3
20459  113650  022122                  1$:     CMP     (R1)+,(R2)+
20460  113652  001020                          BNE     XXB10           ;BRANCH IF INCORRECT.
20461  113654  077303                          SOB     R3,1$
20462  113656  022700  106473                  CMP     #XXBTP1-5201,R0 ;IS R0 CORRECT.
20463  113662  001014                          BNE     XXB10           ;BRANCH IF INCORRECT.
20464  113664  022705  000210                  CMP     #210,R5         ;IS THE FPS CORRECT?
20465  113670  001011                          BNE     XXB10           ;BRANCH IF INCORRECT.
20466  113672  000411                          BR      XXBDONE
20467
20468                                  ;THESE ARE DATA TABLES AND A DATA BUFFER.
20469  113674  023245                  XXBTP1: 023245
20470  113676  026720                          26720
20471  113700  122324                          122324
20472  113702  052672                          52672
20473  113704  123245                  XXBTP2: 123245
20474  113706  026720                          26720
20475  113710  122324                          122324
20476  113712  052672                          52672
20477
20478
20479  113714                          XXB10:
20480  113714  104000                          EMT                     ;
20481  113716                          XXBDONE:
20482  113716  004767  010650                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20483                                                                  ;SEE IF THE USER HAS EXPRESSED
20484                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20485                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20486                                                                  ;THE USER TYPED CONTROL G?).
20487
20488                                  ;*****************************************************************************
20489                                  ;TEST 554       SPECIAL DEST, MODE 7, TEST
20490                                  ;*****************************************************************************
20491  113722                          TS554:
20492
20493  113722  012701  114044                  MOV     #YYBTP1,R1      ;SET UP THE DATA BUFFER.
20494  113726  012700  114054                  MOV     #YYBTP2,R0
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20495  113732  012702  000004            MOV     #4,R2
20496  113736  012021                1$: MOV     (R0)+,(R1)+
20497  113740  077202                    SOB     R2,1$
20498  113742  012700  106663            MOV     #YYBTP3-5201,R0
20499  113746  012760  114044  005201    MOV     #YYBTP1,5201(R0)
20500  113754  042737  100000  114044    BIC     #100000,@#YYBTP1        ;MAKE THE OPERAND POSITIVE.
20501  113762  012701  000200            MOV     #200,R1         ;SET FD.
20502  113766  170101                    LDFPS   R1
20503
20504  113770  005001                    CLR     R1
20505  113772  170770  005201        YYB2: NEGD  @5201(R0)               ;TEST INSTRUCTION.
20506
20507  113776  170205                    STFPS   R5              ;GET FPS.
20508  114000  005701                    TST     R1              ;WAS THE PC CORRECT AFTER EXECUTION?
20509  114002  001031                    BNE     YYB10
20510  114004  012701  114044            MOV     #YYBTP1,R1              ;IS THE RESULT CORRECT.
20511  114010  012702  114054            MOV     #YYBTP2,R2
20512  114014  012703  000004            MOV     #4,R3
20513  114020  022122                1$: CMP     (R1)+,(R2)+
20514  114022  001021                    BNE     YYB10           ;BRANCH IF INCORRECT.
20515  114024  077303                    SOB     R3,1$
20516  114026  022700  106663            CMP     #YYBTP3-5201,R0 ;IS R0 CORRECT.
20517  114032  001015                    BNE     YYB10           ;BRANCH IF INCORRECT.
20518  114034  022705  000210            CMP     #210,R5         ;IS THE FPS CORRECT?
20519  114040  001012                    BNE     YYB10           ;BRANCH IF INCORRECT.
20520  114042  000412                    BR      YYBDONE
20521
20522                                ;THESE ARE DATA TABLES AND A DATA BUFFER.
20523  114044  023245                YYBTP1: 023245
20524  114046  026720                        26720
20525  114050  122324                        122324
20526  114052  052672                        52672
20527  114054  123245                YYBTP2: 123245
20528  114056  026720                        26720
20529  114060  123324                        123324
20530  114062  052672                        52672
20531  114064  114044                YYBTP3: YYBTP1
20532  114066                        YYB10:
20533  114066  104000                        EMT                     ;
20534
20535  114070                        YYBDONE:
20536  114070  004767  010476                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20537                                                                ;SEE IF THE USER HAS EXPRESSED
20538                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
20539                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20540                                                                ;THE USER TYPED CONTROL G?).
20541                                ;*****************************************************************************
20542                                ;TEST 555       NEGD, ABSD AND TSTD TEST
20543                                ;********************************************* *****************************************
20544  114074                        TS555:
20545                                ;TEST NEGD WITH POS NONZERO OPERAND
20546  114074  004767  000526        WWB1:   JSR     PC,NATSUB
20547  114100  000000                1$:     0                       ;FLAG=NEGD.
20548  114102  016341                2$:     16341                   ;OPERAND.
20549  114104  055772                        55772
20550  114106  021133                        21133
```

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20551  114110  055447                          55447
20552  114112  116341                  3$:     116341                  ;RESULT.
20553  114114  055772                          55772
20554  114116  021133                          21133
20555  114120  055447                          55447
20556  114122  016341                  4$:     16341                   ;ERROR RES.
20557  114124  055772                          55772
20558  114126  021133                          21133
20559  114130  055447                          55447
20560  114132  000207                  5$:     207                     ;FPS BEFORE EXECUTION.
20561  114134  000210                          210                     ;FPS AFTER EXECUTION.
20562  114136  000200                          200                     ;ERROR FPS.
20563  114140  177777                          -1                      ;FEC
20564                                  ;TEST NEGD WITH NEG OPERAND.
20565  114142  004767  000460          WWB2:   JSR     PC,NATSUB
20566  114146  000000                  1$:     0                       ;FLAG=NEGD.
20567  114150  152525                  2$:     152525                  ;OPERAND.
20568  114152  053545                          53545
20569  114154  055565                          55565
20570  114156  057505                          57505
20571  114160  052525                  3$:     52525                   ;RESULT.
20572  114162  053545                          53545
20573  114164  055565                          55565
20574  114166  057505                          57505
20575  114170  152525                  4$:     152525                  ;ERROR RES.
20576  114172  053545                          53545
20577  114174  055565                          55565
20578  114176  057505                          57505
20579  114200  000217                  5$:     217                     ;FPS BEFORE EXECUTION.
20580  114202  000200                          200                     ;FPS AFTER EXECUTION.
20581  114204  000210                          210                     ;ERROR FPS.
20582  114206  177777                          -1                      ;FEC
20583                                  ;TEST ABSD WITH POSITIVE OPERAND
20584  114210  004767  000412          WWB3:   JSR     PC,NATSUB
20585  114214  000001                  1$:     1                       ;FLAG=ABSD.
20586  114216  060705                  2$:     60705                   ;OPERAND.
20587  114220  124735                          124735
20588  114222  060124                          60124
20589  114224  073560                          73560
20590  114226  060705                  3$:     60705                   ;RESULT.
20591  114230  124735                          124735
20592  114232  060124                          60124
20593  114234  073560                          73560
20594  114236  160705                  4$:     160705                  ;ERROR RES.
20595  114240  124735                          124735
20596  114242  060124                          60124
20597  114244  073560                          73560
20598  114246  000217                  5$:     217                     ;FPS BEFORE EXECUTION.
20599  114250  000200                          200                     ;FPS AFTER EXECUTION.
20600  114252  000210                          210                     ;ERROR FPS.
20601  114254  177777                          -1                      ;EITHER BUT OP1B
20602                                  ;TEST ABSD WITH NEG. OPERAND
20603  114256  004767  000344          WWB4:   JSR     PC,NATSUB
20604  114262  000001                  1$:     1                       ;FLAG=ABSD.
20605  114264  154345                  2$:     154345                  ;OPERAND.
20606  114266  076567                          76567
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 20607  114270  032123                          32123
 20608  114272  043234                          43234
 20609  114274  054345                  3$:     54345                   ;RESULT.
 20610  114276  076567                          76567
 20611  114300  032123                          32123
 20612  114302  043234                          43234
 20613  114304  154345                  4$:     154345                  ;ERROR RES.
 20614  114306  076567                          76567
 20615  114310  032123                          32123
 20616  114312  043234                          43234
 20617  114314  000217                  5$:     217                     ;FPS BEFORE EXECUTION.
 20618  114316  000200                          200                     ;FPS AFTER EXECUTION.
 20619  114320  177777                          -1                      ;ERROR FPS.
 20620  114322  177777                          -1
 20621                                  ;TEST WITH POSITIVE OP
 20622  114324  004767  000276          WWB5:   JSR     PC,NATSUB
 20623  114330  000002                  1$:     2                       ;FLAG=TSTD.
 20624  114332  012321                  2$:     12321                   ;OPERAND.
 20625  114334  045654                          45654
 20626  114336  070107                          70107
 20627  114340  034543                          34543
 20628  114342  012321                  3$:     12321                   ;RESULT.
 20629  114344  045654                          45654
 20630  114346  070107                          70107
 20631  114350  034543                          34543
 20632  114352  112321                  4$:     112321                  ;ERROR RES.
 20633  114354  045654                          45654
 20634  114356  070107                          70107
 20635  114360  034543                          34543
 20636  114362  000217                  5$:     217                     ;FPS BEFORE EXECUTION.
 20637  114364  000200                          200                     ;FPS AFTER EXECUTION.
 20638  114366  000210                          210                     ;ERROR FPS.
 20639  114370  177777                          -1
 20640                                  ;TEST TSTD WITH NEG OP
 20641  114372  004767  000230          WWB6:   JSR     PC,NATSUB
 20642  114376  000002                  1$:     2                       ;FLAG=TSTD.
 20643  114400  123765                  2$:     123765                  ;OPERAND.
 20644  114402  023407                          23407
 20645  114404  034510                          34510
 20646  114406  045621                          45621
 20647  114410  123765                  3$:     123765                  ;RESULT.
 20648  114412  023407                          23407
 20649  114414  034510                          34510
 20650  114416  045621                          45621
 20651  114420  023765                  4$:     23765                   ;ERROR RES.
 20652  114422  023407                          23407
 20653  114424  034510                          34510
 20654  114426  045621                          45621
 20655  114430  000207                  5$:     207                     ;FPS BEFORE EXECUTION.
 20656  114432  000210                          210                     ;FPS AFTER EXECUTION.
 20657  114434  000200                          200                     ;ERROR FPS.
 20658  114436  177777                          -1
 20659                                  ;TEST TSTD 0 OP
 20660  114440  004767  000162          WWB7:   JSR     PC,NATSUB
 20661  114444  000002                  1$:     2                       ;FLAG=TSTD.
 20662  114446  000175                  2$:     175                     ;OPERAND.
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20663  114450  176737                  176737
20664  114452  071727                  71727
20665  114454  037574                  37574
20666  114456  000175          3$:     175                     ;RESULT.
20667  114460  176737                  176737
20668  114462  071727                  71727
20669  114464  037574                  37574
20670  114466  000000          4$:     0                       ;ERROR RES.
20671  114470  000000                  0
20672  114472  000000                  0
20673  114474  000000                  0
20674  114476  000200          5$:     200                     ;FPS BEFORE EXECUTION.
20675  114500  000204                  204                     ;FPS AFTER EXECUTION.
20676  114502  000214                  214                     ;ERROR FPS.
20677  114504  177777                  -1
20678                          ;TEST TSTD -0 OP FIUV=0
20679  114506  004767  000114  WWB10:  JSR     PC,NATSUB
20680  114512  000002          1$:     2                       ;FLAG=TSTD.
20681  114514  100123          2$:     100123                  ;OPERAND.
20682  114516  021012                  21012
20683  114520  034565                  34565
20684  114522  043210                  43210
20685  114524  100123          3$:     100123                  ;RESULT.
20686  114526  021012                  21012
20687  114530  034565                  34565
20688  114532  043210                  43210
20689  114534  000000          4$:     0                       ;ERROR RES.
20690  114536  000000                  0
20691  114540  000000                  0
20692  114542  000000                  0
20693  114544  040203          5$:     40203                   ;FPS BEFORE EXECUTION.
20694  114546  040214                  040214                  ;FPS AFTER EXECUTION.
20695  114550  140214                  140214                  ;ERROR FPS.
20696  114552  177777                  -1
20697                          ;TEST TSTD -0 OP FIUV=1
20698  114554  004767  000046  WWB11:  JSR     PC,NATSUB
20699  114560  000002          1$:     2                       ;FLAG=TSTD.
20700  114562  100137          2$:     100137                  ;OPERAND.
20701  114564  024613                  24613
20702  114566  057024                  57024
20703  114570  060137                  60137
20704  114572  100137          3$:     100137                  ;RESULT.
20705  114574  024613                  24613
20706  114576  057024                  57024
20707  114600  060137                  60137
20708  114602  000000          4$:     0                       ;ERROR RES.
20709  114604  000000                  0
20710  114606  000000                  0
20711  114610  000000                  0
20712  114612  044200          5$:     44200                   ;FPS BEFORE EXECUTION.
20713  114614  144214                  144214                  ;FPS AFTER EXECUTION.
20714  114616  044214                  044214                  ;ERROR FPS.
20715  114620  000014                  14
20716  114622  000167  000162          JMP     WWBDONE
20717
20718                          ;THIS SUBROUTINE, NATSUB, IS USED TO SET UP THE OPERANDS, EXECUTE
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20719                   ;THE EITHER A TSTD, AN ABSD OR A NEGD INSTRUCTION AND CHECK THE RESULTS. A CALL
20720                   ;TO IT IS MADE THUS:
20721                   ;
20722                   ;               JSR     PC,@#NATSUB
20723                   ;               FLAG:   .WORD   X               ;INSTRUCTION TYPE FLAG.
20724                   ;               ACARG:  .WORD   X,X,X,X         ;OPERAND
20725                   ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
20726                   ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
20727                   ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
20728                   ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
20729                   ;               FEC:    .WORD   X               ;EXPECTED FEC
20730                   ;               ERFPS:  .WORD   X               ;ERROR FPS.
20731                   ;               ERR1:   ERROR   X               ;DATA ERROR.
20732                   ;                       BR      CONT
20733                   ;               ERR2:   ERROR   X               ;FPS ERROR.
20734                   ;               CONT:                           ;RETURN ADDRESS
20735                   ;
20736                   ;THE OPERAND IS SET UP IN NATBF1. THEN
20737                   ;THE EITHER THE TSTD, NEGD OR ABSD INSTRUCTION IS EXECUTED.
20738                   ;NATSUB USES THE FIRST OPERAND AS A FLAG TO DETERMINE WHICH INSTRUCTION
20739                   ;IS TO BE EXECUTED: 0 = NEGD, 1 = ABSD, 2 = TSTD.
20740                   ;THE RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
20741                   ;COMPARED WITH FPSA. IF THIS TOO IS CORRECT NATSUB RETURNS CONTROL
20742                   ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD NATSUB
20743                   ;COMPARE IT TO ERROR FPS. IF THIS MATCHES THEN NATSUB WILL RETURN
20744                   ;TO THE ERROR CALL AT ERR2, OTHERWISE NATSUB ITSELF
20745                   ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
20746                   ;INSTRUCTION IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
20747                   ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
20748                   ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN NATSUB
20749                   ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR1. OTHERWISE THE
20750                   ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND NATSUB WILL
20751                   ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
20752
20753
20754  114626  012601               NATSUB: MOV     (SP)+,R1                ;GET A POINTER TO THE ARGUMENTS.
20755  114630  010102                       MOV     R1,R2           ;COPY THE OPERAND.
20756  114632  062702  000002               ADD     #2,R2
20757  114636  012703  114776               MOV     #NATBF1,R3
20758  114642  012704  000004               MOV     #4,R4
20759  114646  012223               1$:     MOV     (R2)+,(R3)+
20760  114650  077402                       SOB     R4,1$
20761  114652  016100  000032               MOV     32(R1),R0       ;LOAD THE FPS.
20762  114656  170100                       LDFPS   R0
20763  114660  012700  114776               MOV     #NATBF1,R0      ;SET UP THE OPERAND ADDRESS.
20764  114664  011102                       MOV     (R1),R2         ;GET THE FLAG TO DETERMINE WHICH
20765  114666  006302                       ASL     R2              ;INSTRUCTION TO EXECUTE.
20766  114670  006302                       ASL     R2              ;0 = NEGD, 1 = ABSD, 2 = TSTD
20767  114672  012703  114702               MOV     #NATINS,R3
20768  114676  060203                       ADD     R2,R3
20769  114700  000113                       JMP     (R3)            ;GO EXECUTE THE INSTRUCTION.
20770  114702  170710               NATINS: NEGD    (R0)
20771  114704  000403                       BR      2$
20772  114706  170610                       ABSD    (R0)
20773  114710  000401                       BR      2$
20774  114712  170510                       TSTD    (R0)
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20775
20776  114714  170204                  2$:     STFPS   R4              ;GET THE FPS.
20777  114716  170305                          STST    R5              ;GET THE FEC.
20778  114720  010100                          MOV     R1,R0           ;WAS THE RESULT CORRECT?
20779  114722  062700  000012                  ADD     #12,R0
20780  114726  012702  114776                  MOV     #NATBF1,R2
20781  114732  012703  000004                  MOV     #4,R3
20782  114736  022022                  3$:     CMP     (R0)+,(R2)+
20783  114740  001014                          BNE     10$             ;BRANCH IF INCORRECT.
20784  114742  077303                          SOB     R3,3$
20785  114744  026104  000034                  CMP     34(R1),R4       ;WAS THE FPS CORRECT?
20786  114750  001010                          BNE     10$             ;BRANCH IF INCORRECT.
20787  114752  005761  000034                  TST     34(R1)          ;IF THE EXPECTED FPS WAS NEGATIVE CHECK THE FEC.
20788  114756  100003                          BPL     4$
20789  114760  026105  000040                  CMP     40(R1),R5       ;WAS THE FEC CORRECT.
20790  114764  001002                          BNE     10$             ;BRANCH IF INCORRECT.
20791  114766  000161  000042          4$:     JMP     42(R1)          ;RETURN.
20792
20793  114772                          10$:
20794  114772  104000                          EMT                     ;
20795
20796  114774  177777                          .WORD   -1
20797  114776  177777  177777  177777  NATBF1: .WORD   -1,-1,-1,-1,-1
20798  115004  177777  177777
20799
20800  115010                          WWBDONE:
20801  115010  004767  007556                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20802                                                                  ;SEE IF THE USER HAS EXPRESSED
20803                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20804                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20805                                                                  ;THE USER TYPED CONTROL G?).
20806
20807
20808
20809                                  ;*****************************************************************************
20810                                  ;TEST 556       SOURCE MODES, MODE 1 (FL=0), TEST
20811                                  ;*****************************************************************************
20812  115014                          TS556:
20813
20814
20815
20816  115014  012700  115064                  MOV     #AACTP1,R0      ;SET UP TEST DATA IN BUFFER.
20817  115020  012710  147517                  MOV     #147517,(R0)
20818  115024  012737  115040  037364          MOV     #AAC2,@#$TMP2
20819  115032  012737  115070  000004          MOV     #AAC10,@#ERRVECT        ;SET UP FOR TRAPS TO 4.
20820  115040  170110                  AAC2:   LDFPS   (R0)            ;TEST INSTRUCTION.
20821
20822  115042  170205                          STFPS   R5              ;GET FPS
20823
20824  115044  020027  115064                  CMP     R0,#AACTP1      ;IS R0 CORRECT?
20825  115050  001007                          BNE     AAC10           ;BR IF NOT.
20826  115052  022705  147517                  CMP     #147517,R5      ;IS FPS CORRECT?
20827  115056  001004                          BNE     AAC10           ;BR IF NOT.
20828  115060  000404                          BR      AACDONE
20829
20830                                  ;TEST BUFFER AND DATA:
```

```
20831  115062  177777                          -1
20832  115064  147517                AACTP1:   147517
20833  115066  177777                          -1
20834  115070                        AAC10:
20835  115070  104000                          EMT                     ;
20836
20837  115072                        AACDONE:
20838  115072  004767  007474                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20839                                                                  ;SEE IF THE USER HAS EXPRESSED
20840                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20841                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20842                                                                  ;THE USER TYPED CONTROL G?).
20843
20844
20845                                 ;*****************************************************************************
20846                                 ;TEST 557       SOURCE MODES, MODE 2 (FL=0), TEST
20847                                 ;*****************************************************************************
20848  115076                        TS557:
20849
20850
20851  115076  012700  115140                  MOV     #BBCTP1,R0      ;SET UP TEST DATA IN BUFFER.
20852  115102  012710  145212                  MOV     #145212,(R0)
20853  115106  012737  115144  000004          MOV     #BBC10,@#ERRVECT ;SET UP FOR TRAPS TO 4.
20854
20855  115114  170120                BBC2:     LDFPS   (R0)+           ;TEST INSTRUCTION.
20856
20857  115116  170205                          STFPS   R5              ;GET FPS
20858
20859  115120  020027  115142                  CMP     R0,#BBCTP1+2    ;IS R0 CORRECT?
20860  115124  001007                          BNE     BBC10           ;BR IF NOT.
20861  115126  022705  145212                  CMP     #145212,R5      ;IS THE FPS CORRECT?
20862  115132  001004                          BNE     BBC10           ;BR IF NOT.
20863  115134  000404                          BR      BBCDONE
20864
20865
20866                                 ;TEST BUFFER AND DATA:
20867  115136  177777                          -1
20868  115140  177777                BBCTP1:   .WORD   -1
20869  115142  177777                          -1
20870
```

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20871
20872  115144                          BBC10:
20873  115144  104000                          EMT                     ;
20874  115146                          BBCDONE:
20875  115146  004767  007420                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
20876                                                                  ;SEE IF THE USER HAS EXPRESSED
20877                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20878                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20879                                                                  ;THE USER TYPED CONTROL G?).
20880
20881
20882                                  ;*********************************************************************************
20883                                  ;TEST 560       SOURCE MODES, MODE 4 (FL=0), TEST
20884                                  ;*********************************************************************************
20885  115152                          TS560:
20886
20887
20888  115152  012700  115234                  MOV     #DDCTP1+2,R0    ;SET UP THE TEST DATA BUFFER.
20889  115156  012760  105252  177776          MOV     #105252,-2(R0)
20890  115164  012737  115200  037364          MOV     #DDC2,@#$TMP2
20891  115172  012737  115244  000004          MOV     #DDC10,@#ERRVEC
20892  115200  170140                  DDC2:   LDFPS   -(R0)
20893  115202  170205                          STFPS   R5
20894  115204  020027  115232                  CMP     R0,#DDCTP1
20895  115210  001015                          BNE     DDC10
20896  115212  022705  105252                  CMP     #105252,R5
20897  115216  001012                          BNE     DDC10
20898  115220  000412                          BR      DDCDONE
20899
20900  115222  177777  177777  177777          -1,-1,-1,-1
20901  115230  177777
20902  115232  177777                  DDCTP1: -1
20903  115234  177777  177777  177777          -1,-1,-1,-1
20904  115242  177777
20905  115244                          DDC10:
20906  115244  104000                          EMT                     ;
20907  115246                          DDCDONE:
20908  115246  004767  007320                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
20909                                                                  ;SEE IF THE USER HAS EXPRESSED
20910                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20911                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20912                                                                  ;THE USER TYPED CONTROL G?).
20913                                  ;*********************************************************************************
20914                                  ;TEST 561       SOURCE MODES, MODE 3 (FL=0), TEST
20915                                  ;*********************************************************************************
20916  115252                          TS561:
20917  115252  012700  115340                  MOV     #EECTP2,R0
20918  115256  012710  115330                  MOV     #EECTP1,(R0)
20919  115262  012767  103456  000040          MOV     #103456,EECTP1
20920  115270  012737  115352  000004          MOV     #EEC10,@#ERRVECT ;SET UP FOR TRAPS TO 4.
20921  115276  170130                  EEC2:   LDFPS   @(R0)+          ;TEST INSTRUCTION.
20922  115300  170205                          STFPS   R5              ;GET THE FPS.
20923  115302  020027  115342                  CMP     R0,#EECTP2+2    ;IS R0 CORRECT?
20924  115306  001021                          BNE     EEC10           ;BR IF NOT.
20925  115310  022705  103456                  CMP     #103456,R5      ;IS THE FPS CORRECT?
20926  115314  001016                          BNE     EEC10           ;BR IF NOT.
```

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20927  115316  000416                          BR      EECDONE
20928
20929
20930                                  ;TEST BUFFER AND DATA:
20931  115320  177777  177777  177777          -1,-1,-1,-1
20932  115326  177777
20933  115330  177777                  EECTP1: -1
20934  115332  177777  177777  177777          -1,-1,-1
20935  115340  115330  177777  177777  EECTP2: EECTP1,-1,-1,-1,
20936  115346  177777  000000
20937
20938  115352                          EEC10:
20939  115352  104000                          EMT                     ;
20940  115354                          EECDONE:
20941  115354  004767  007212                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20942                                                                  ;SEE IF THE USER HAS EXPRESSED
20943                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20944                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20945                                                                  ;THE USER TYPED CONTROL G?).
20946                                  ;*****************************************************************************
20947                                  ;TEST 562       SOURCE MODES, MODE 5 (FL=0), TEST
20948                                  ;*****************************************************************************
20949  115360                          TS562:
20950  115360  012700  115444                  MOV     #FFCTP2+2,R0    ;SET UP THE TEST DATA BUFFER.
20951  115364  012760  115432  177776          MOV     #FFCTP1,-2(R0)
20952  115372  012737  045412  115432          MOV     #45412,@#FFCTP1
20953  115400  012737  115452  000004          MOV     #FFC10,@#ERRVECT ;SET UP FOR TRAPS TO 4.
20954  115406  170150                  FFC2:   LDFPS   @-(R0)          ;TEST INSTRUCTION.
20955  115410  170205                          STFPS   R5              ;GET THE FPS.
20956  115412  020027  115442                  CMP     R0,#FFCTP2      ;IS R0 CORRECT?
20957  115416  001015                          BNE     FFC10           ;BR IF NOT.
20958  115420  022705  045412                  CMP     #45412,R5       ;IS THE FPS CORRECT?
20959  115424  001012                          BNE     FFC10           ;BR IF NOT.
20960  115426  000412                          BR      FFCDONE
20961
20962
20963                                  ;TEST BUFFER AND DATA:
20964  115430  177777                          -1
20965  115432  177777                  FFCTP1: -1
20966  115434  177777  177777  177777          -1,-1,-1
20967  115442  115432  177777  177777  FFCTP2: FFCTP1,-1,-1,-1
20968  115450  177777
20969
20970  115452                          FFC10:
20971  115452  104000                          EMT                     ;
20972  115454                          FFCDONE:
20973  115454  004767  007112                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
20974                                                                  ;SEE IF THE USER HAS EXPRESSED
20975                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
20976                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
20977                                                                  ;THE USER TYPED CONTROL G?).
20978                                  ;*****************************************************************************
20979                                  ;TEST 563       SOURCE MODES. MODE 6 (FL=0), TEST
20980                                  ;*****************************************************************************
20981  115460                          TS563:
20982  115460  012700  110333                  MOV     #GGCTP1-5201,R0 ;SET UP THE TEST DATA BUFFER.
```

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20983  115464  012737  046543  115534          MOV     #46543,@#GGCTP1
20984  115472  005001                          CLR     R1
20985  115474  012737  115546  000004          MOV     #GGC10,@#ERRVECT ;SET UP FOR TRAPS TO 4.
20986  115502  170160  005201          GGC2:   LDFPS   5201(R0)                 ;TEST INSTRUCTION.
20987  115506  170204                          STFPS   R4               ;GET THE FPS.
20988  115510  005701                          TST     R1               ;WAS PC CORRECT AFTER EXECUTION?
20989  115512  001015                          BNE     GGC10            ;BR IF NOT.
20990  115514  020027  110333                  CMP     R0,#GGCTP1-5201  ;IS R0 CORRECT?
20991  115520  001012                          BNE     GGC10            ;BR IF NOT.
20992  115522  022704  046543                  CMP     #46543,R4        ;IS THE FPS CORRECT?
20993  115526  001007                          BNE     GGC10            ;BR IF NOT.
20994  115530  000407                          BR      GGCDONE
20995
20996
20997                                  ;TEST BUFFER AND DATA:
20998  115532  177777                          -1
20999  115534  177777  177777  177777  GGCTP1: -1,-1,-1,-1
21000  115542  177777
21001  115544  177777                          -1
21002  115546                          GGC10:
21003  115546  104000                          EMT                      ;
21004  115550                          GGCDONE:
21005  115550  004767  007016                  JSR     PC,..RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21006                                                                   ;SEE IF THE USER HAS EXPRESSED
21007                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
21008                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21009                                                                   ;THE USER TYPED CONTROL G?).
21010                                  ;*****************************************************************************
21011                                  ;TEST 564       SOURCE MODES, MODE 7 (FL=0), TEST
21012                                  ;*****************************************************************************
21013  115554                          TS564:
21014  115554  012700  110445                  MOV     #HHCTP2-5201,R0 ;SET UP THE TEST DATA BUFFER.
21015  115560  012760  115636  005201          MOV     #HHCTP1,5201(R0)
21016  115566  012737  004547  115636          MOV     #4547,@#HHCTP1
21017  115574  005001                          CLR     R1
21018  115576  012737  115656  000004          MOV     #HHC10,@#ERRVECT ;SET UP FOR TRAPS TO 4.
21019  115604  170170  005201          HHC2:   LDFPS   @5201(R0)                ;TEST INSTRUCTION.
21020  115610  170204                          STFPS   R4               ;GET THE FPS.
21021  115612  005701                          TST     R1               ;WAS PC CORRECT AFTER EXECUTION?
21022  115614  001020                          BNE     HHC10            ;BR IF NOT.
21023  115616  020027  110445                  CMP     R0,#HHCTP2-5201  ;IS R0 CORRECT?
21024  115622  001015                          BNE     HHC10            ;BR IF NOT.
21025  115624  022704  004547                  CMP     #4547,R4         ;IS THE FPS CORRECT?
21026  115630  001012                          BNE     HHC10            ;BR IF NOT.
21027  115632  000412                          BR      HHCDONE
21028
21029
21030                                  ;TEST BUFFER AND DATA:
21031  115634  177777                          -1
21032  115636  177777  177777  177777  HHCTP1: .WORD -1,-1,-1,-1
21033  115644  177777
21034  115646  177777  177777  177777  HHCTP2: .WORD -1,-1,-1,-1
21035  115654  177777
21036  115656                          HHC10:
21037  115656  104000                          EMT                      ;
21038  115660                          HHCDONE:
```

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21039  115660  004767  006706                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21040                                                                   ;SEE IF THE USER HAS EXPRESSED
21041                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
21042                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21043                                                                   ;THE USER TYPED CONTROL G?).
21044
21045
21046
21047                                   ;*****************************************************************************
21048                                   ;TEST 565       SOURCE MODES, MODE 2 GR7 (FL=1), TEST
21049                                   ;*****************************************************************************
21050  115664                           TS565:
21051
21052  115664  012737  115722  000004          MOV     #IIC20,@#ERRVECT ;SET UP FOR TRAPS TO 4.
21053  115672  012700  000300                  MOV     #300,R0
21054  115676  170100                          LDFPS   R0
21055  115700  005001                          CLR     R1
21056
21057  115702  177027                  IIC2:   LDCLD   (R7)+,AC0               ;TEST INSTRUCTION.
21058  115704  005201                          5201
21059  115706  005201                          5201
21060  115710  005201                          5201
21061  115712  005201                          5201
21062
21063  115714  020127  000003                  CMP     R1,#3           ;WAS PC CORRECT AFTER EXECUTION?
21064  115720  001401                          BEQ     IICDONE
21065  115722                          IIC20:
21066  115722  104000                          EMT                     ;
21067
21068  115724                          IICDONE:
21069  115724  004767  006642                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21070                                                                   ;SEE IF THE USER HAS EXPRESSED
21071                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
21072                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21073                                                                   ;THE USER TYPED CONTROL G?).
21074
21075
21076                                   ;*****************************************************************************
21077                                   ;TEST 566       SOURCE MODES, MODE 2 (FL=1), TEST
21078                                   ;*****************************************************************************
21079  115730                           TS566:
21080
21081  115730  012700  000300                  MOV     #300,R0
21082  115734  170100                          LDFPS   R0
21083  115736  012700  116002                  MOV     #TCCBF0,R0      ;SET UP THE TEST DATA BUFFER.
21084  115742  177020                  TCC2:   LDCLD   (R0)+,AC0               ;TEST INSTRUCTION.
21085
21086  115744  170204                          STFPS   R4              ;GET THE FPS.
21087  115746  012701  116012                  MOV     #TCCBF1,R1      ;GET THE RESULT.
21088  115752  012702  000200                  MOV     #200,R2
21089  115756  170102                          LDFPS   R2
21090  115760  174011                          STD     AC0,(R1)
21091  115762  020027  116006                  CMP     R0,#TCCBF0+4    ;IS R0 CORRECT?
21092  115766  001401                          BEQ     TCC3
21093  115770  104000                          EMT                     ;
21094
```

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21095  115772  022704  000300          TCC3:   CMP     #300,R4 ;IS THE FPS CORRECT?
21096  115776  001411                          BEQ     TCCDONE
21097  116000  104000                          EMT                     ;
21098
21099
21100                                  ;TEST BUFFER AND DATA:
21101  116002  001234  067076  054321  TCCBF0: .WORD   01234,67076,54321,012345
21102  116010  012345
21103  116012  177777  177777  177777  TCCBF1: -1,-1,-1,-1
21104  116020  177777
21105
21106  116022                          TCCDONE:
21107  116022  004767  006544                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21108                                                                  ;SEE IF THE USER HAS EXPRESSED
21109                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
21110                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21111                                                                  ;THE USER TYPED CONTROL G?).
21112
21113
21114
21115                                  ;*****************************************************************************
21116                                  ;TEST 567       LDCIF AND LDCLF TEST
21117                                  ;*****************************************************************************
21118  116026                          TS567:
21119
21120
21121                                  ;ZERO   OPERAND FL=0
21122
21123  116026  004737  116720          KKC1:   JSR     PC,@#LDCFSUB    ;GO EXECUTE INSTRUCTION.
21124
21125  116032  000000  000000          1$:     .WORD   0,0             ;FSRC OPERAND.
21126  116036  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
21127  116042  177777  177777          3$:     .WORD   -1,-1           ;ANTICIPATED ERRONEOUS RESULT.
21128  116046  000000                  4$:     0                       ;FPS BEFORE EXECUTION.
21129  116050  000004                          4                       ;FPS AFTER EXECUTION.
21130  116052  177777                          -1                      ;ANTICIPATED ERRONEOUS FPS.
21131                                  ;ZERO   OPERAND FL=0
21132
21133  116054  004737  1'6720          KKC2:   JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21134
21135  116060  000000  177777          1$:     .WORD   0,-1            ;FSRC OPERAND.
21136  116064  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
21137  116070  004177  177400          3$:     4177,177400             ;ANTICIPATED ERRONEOUS RESULT.
21138  116074  000000                  4$:     0                       ;FPS BEFORE EXECUTION.
21139  116076  000004                          4                       ;FPS AFTER EXECUTION.
21140  116100  177777                          -1                      ;ANTICIPATED ERRONEOUS FPS.
21141                                  ;ZERO   OPERAND FL=1
21142
21143  116102  004737  116720          KKC3:   JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21144
21145  116106  000000  000000          1$:     .WORD   0,0             ;FSRC OPERAND.
21146  116112  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
21147  116116  177777  177777          3$:     .WORD   -1,-1           ;ANTICIPATED ERRONEOUS RESULT.
21148  116122  000100                  4$:     100                     ;FPS BEFORE EXECUTION.
21149  116124  000104                          104                     ;FPS AFTER EXECUTION.
21150  116126  000004                          4                       ;ANTICIPATED ERRONEOUS FPS.
```

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21151
21152  116130  004737  116720  KKC4:   JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21153  116134  040000  000000  1$:     .WORD   40000,0         ;FSRC OPERAND.
21154  116140  043600  000000  2$:     .WORD   43600,0         ;EXPECTED RESULT.
21155  116144  047600  000000  3$:     .WORD   47600,0         ;ANTICIPATED ERRONEOUS RESULT.
21156  116150  000017          4$:     17                      ;FPS BEFORE EXECUTION.
21157  116152  000000                  0                       ;FPS AFTER EXECUTION.
21158  116154  177777                  -1                      ;ANTICIPATED ERRONEOUS FPS.
21159                          ;OPERAND=1,     FL=0
21160  116156  004737  116720  KKC5:   JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21161  116162  000001  000000  1$:     .WORD   1,0             ;FSRC OPERAND.
21162  116166  040200  000000  2$:     .WORD   40200,0         ;EXPECTED RESULT.
21163  116172  044200  000000  3$:     .WORD   44200,0         ;ANTICIPATED ERRONEOUS RESULT.
21164  116176  000017          4$:     17                      ;FPS BEFORE EXECUTION.
21165  116200  000000                  0                       ;FPS AFTER EXECUTION.
21166  116202  177777                  -1                      ;ANTICIPATED ERRONEOUS FPS.
21167                          ;OPERAND=       PATTERN FL=0
21168  116204  004737  116720  KKC6:   JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21169  116210  000252  000000  1$:     .WORD   252,0           ;FSRC OPERAND.
21170  116214  042052  000000  2$:     .WORD   42052,0         ;EXPECTED RESULT.
21171  116220  046052  000000  3$:     .WORD   46052,0         ;ANTICIPATED ERRONEOUS RESULT.
21172  116224  000000          4$:     0                       ;FPS BEFORE EXECUTION.
21173  116226  000000                  0                       ;FPS AFTER EXECUTION.
21174  116230  177777                  -1                      ;ANTICIPATED ERRONEOUS FPS.
21175                          ;OPERAND=-40000 FL=0
21176  116232  004737  116720  KKC7:   JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21177  116236  140000  000000  1$:     .WORD   -40000,0                ;FSRC OPERAND.
21178  116242  143600  000000  2$:     .WORD   143600,0                ;EXPECTED RESULT.
21179  116246  043600  000000  3$:     .WORD   43600,0         ;ANTICIPATED ERRONEOUS RESULT.
21180  116252  000007          4$:     7                       ;FPS BEFORE EXECUTION.
21181  116254  000010                  10                      ;FPS AFTER EXECUTION.
21182  116256  177777                  -1                      ;ANTICIPATED ERRONEOUS FPS.
21183                          ;OPERAND=-1     FL-0
21184  116260  004737  116720  KKC10:  JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21185  116264  177777  000000  1$:     .WORD   -1,0            ;FSRC OPERAND.
21186  116270  140200  000000  2$:     .WORD   140200,0                ;EXPECTED RESULT.
21187  116274  144000  000400  3$:     .WORD   144000,400              ;ANTICIPATED ERRONEOUS RESULT.
21188  116300  000000          4$:     0                       ;FPS BEFORE EXECUTION.
21189  116302  000010                  10                      ;FPS AFTER EXECUTION.
21190  116304  177777                  -1                      ;ANTICIPATED ERRONEOUS FPS.
21191                          ;OPERAND=PATTERN        FL=0
21192  116306  004737  116720  KKC11:  JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21193  116312  125252  000000  1$:     .WORD   125252,0                ;FSRC OPERAND.
21194  116316  143652  126000  2$:     .WORD   143652,126000           ;EXPECTED RESULT.
21195  116322  043652  126000  3$:     .WORD   43652,126000            ;ANTICIPATED ERRONEOUS RESULT.
21196  116326  000007          4$:     7                       ;FPS BEFORE EXECUTION.
21197  116330  000010                  10                      ;FPS AFTER EXECUTION.
21198  116332  177777                  -1                      ;ANTICIPATED ERRONEOUS FPS.
21199                          ;OPERAND        POS     FL-1
21200  116334  004737  116720  KKC12:  JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21201  116340  040000  000000  1$:     .WORD   40000,0         ;FSRC OPERAND.
21202  116344  047600  000000  2$:     .WORD   47600,0         ;EXPECTED RESULT.
21203  116350  043600  000000  3$:     .WORD   43600,0         ;ANTICIPATED ERRONEOUS RESULT.
21204  116354  000117          4$:     117                     ;FPS BEFORE EXECUTION.
21205  116356  000100                  100                     ;FPS AFTER EXECUTION.
21206  116360  177777                  -1                      ;ANTICIPATED ERRONEOUS FPS.
```

```
21207
21208  116362  004737  116720  ;OPERAND=1        FL=1
21209  116366  000000  000001  KKC13:  JSR      PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21210  116372  040200  000000  1$:     .WORD    0,1             ;FSRC OPERAND.
21211  116376  034200  000000  2$:     .WORD    40200,0         ;EXPECTED RESULT.
21212  116402  000100          3$:     .WORD    34200,0         ;ANTICIPATED ERRONEOUS RESULT.
21213  116404  000100          4$:     100                      ;FPS BEFORE EXECUTION.
21214  116406  177777                  100                      ;FPS AFTER EXECUTION.
21215                                   -1                       ;ANTICIPATED ERRONEOUS FPS.
21216  116410  004737  116720  ;OPERAND=        PATTERN FL=1
21217  116414  000000  000252  KKC14:  JSR      PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21218  116420  042052  000000  1$:     .WORD    0,252           ;FSRC OPERAND.
21219  116424  036052  000000  2$:     .WORD    42052,0         ;EXPECTED RESULT.
21220  116430  000111          3$:     .WORD    36052,0         ;ANTICIPATED ERRONEOUS RESULT.
21221  116432  000100          4$:     111                      ;FPS BEFORE EXECUTION.
21222  116434  177777                  100                      ;FPS AFTER EXECUTION.
21223                                   -1                       ;ANTICIPATED ERRONEOUS FPS.
21224  116436  004737  116720  ;OPERAND=-40000,0       FL=1
21225  116442  140000  000000  KKC15:  JSR      PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21226  116446  147600  000000  1$:     .WORD    -40000,0                ;FSRC OPERAND.
21227  116452  047600  000000  2$:     .WORD    147600,0                ;EXPECTED RESULT.
21228  116456  000107          3$:     .WORD    47600,0         ;ANTICIPATED ERRONEOUS RESULT.
21229  116460  000110          4$:     107                      ;FPS BEFORE EXECUTION.
21230  116462  177777                  110                      ;FPS AFTER EXECUTION.
21231                                   -1                       ;ANTICIPATED ERRONEOUS FPS.
21232  116464  004737  116720  ;OPERAND=-1,-1  FL=1
21233  116470  177777  177777  KKC16:  JSR      PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21234  116474  140200  000000  1$:     .WORD    -1,-1           ;FSRC OPERAND.
21235  116500  150000  000000  2$:     .WORD    140200,0                ;EXPECTED RESULT.
21236  116504  000100          3$:     .WORD    150000,0                ;ANTICIPATED ERRONEOUS RESULT.
21237  116506  000110          4$:     100                      ;FPS BEFORE EXECUTION.
21238  116510  177777                  110                      ;FPS AFTER EXECUTION.
21239                                   -1                       ;ANTICIPATED ERRONEOUS FPS.
21240  116512  004737  116720  ;OPERAND=-PATTERN        FL=1,   ROUND MODE
21241  116516  125252  125252  KKC17:  JSR      PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21242  116522  147652  125253  1$:     .WORD    125252,125252           ;FSRC OPERAND.
21243  116526  047652  125253  2$:     .WORD    147652,125253           ;EXPECTED RESULT.
21244  116532  000105          3$:     .WORD    47652,125253            ;ANTICIPATED ERRONEOUS RESULT.
21245  116534  000110          4$:     105                      ;FPS BEFORE EXECUTION.
21246  116536  177777                  110                      ;FPS AFTER EXECUTION.
21247                                   -1                       ;ANTICIPATED ERRONEOUS FPS.
21248  116540  004737  116720  ;OPERAND=77777,177500   FL=1,   ROUND MODE
21249  116544  077777  177500  KKC20:  JSR      PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21250  116550  047777  177777  1$:     .WORD    77777,177500            ;FSRC OPERAND.
21251  116554  047777  177776  2$:     .WORD    47777,177777            ;EXPECTED RESULT.
21252  116560  000117          3$:     .WORD    47777,177776            ;ANTICIPATED ERRONEOUS RESULT.
21253  116562  000100          4$:     117                      ;FPS BEFORE EXECUTION.
21254  116564  177777                  100                      ;FPS AFTER EXECUTION.
21255                                   -1                       ;ANTICIPATED ERRONEOUS FPS.
21256  116566  004737  116720  ;OPERAND=40000,000100   FL=1,   ROUND MODE
21257  116572  040000  000100  KKC21:  JSR      PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21258  116576  047600  000001  1$:     .WORD    40000,100               ;FSRC OPERAND.
21259  116602  047600  000000  2$:     .WORD    47600,1         ;EXPECTED RESULT.
21260  116606  000102          3$:     .WORD    47600,0         ;ANTICIPATED ERRONEOUS RESULT.
21261  116610  000100          4$:     102                      ;FPS BEFORE EXECUTION.
21262  116612  177777                  100                      ;FPS AFTER EXECUTION.
                                        -1                       ;ANTICIPATED ERRONEOUS FPS.
```

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21263
21264  116614  004737  116720      KKC22:  JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21265  116620  040000  000100      1$:     .WORD   40000,100       ;FSRC OPERAND.
21266  116624  047600  000000      2$:     .WORD   47600,0         ;EXPECTED RESULT.
21267  116630  047600  000001      3$:     .WORD   47600,1         ;ANTICIPATED ERRONEOUS RESULT.
21268  116634  000157              4$:     157                     ;FPS BEFORE EXECUTION.
21269  116636  000140                      140                     ;FPS AFTER EXECUTION.
21270  116640  177777                      -1                      ;ANTICIPATED ERRONEOUS FPS.
21271                              ;OPERAND=100000,0 (MOST NEG #)  FL=0
21272  116642  004737  116720      KKC23:  JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21273  116646  100000  000000      1$:     .WORD   100000,0        ;FSRC OPERAND.
21274  116652  144000  000000      2$:     .WORD   144000,0        ;EXPECTED RESULT.
21275  116656  143600  000000      3$:     .WORD   143600,0        ;ANTICIPATED ERRONEOUS RESULT.
21276  116662  000007              4$:     7                       ;FPS BEFORE EXECUTION.
21277  116664  000010                      10                      ;FPS AFTER EXECUTION.
21278  116666  177777                      -1                      ;ANTICIPATED ERRONEOUS FPS.
21279                              ;OPERAND=100000,0       FL=1
21280  116670  004737  116720      KKC24:  JSR     PC,@#LDCFSUB    ;GO EXECUTE THE INSTRUCTION.
21281  116674  100000  000000      1$:     .WORD   100000,0        ;FSRC OPERAND.
21282  116700  150000  000000      2$:     .WORD   150000,0        ;EXPECTED RESULT.
21283  116704  147600  000000      3$:     .WORD   147600,0        ;ANTICIPATED ERRONEOUS RESULT.
21284  116710  000107              4$:     107                     ;FPS BEFORE EXECUTION.
21285  116712  000110                      110                     ;FPS AFTER EXECUTION.
21286  116714  177777                      -1                      ;ANTICIPATED ERRONEOUS FPS.
21287  116716  000441              6$:     BR      KKCDONE
21288
21289                              ;THIS SUBROUTINE, LDCFSUB, IS USED TO SET UP THE OPERANDS, EXECUTE
21290                              ;THE LDCIF OR LDCLF INSTRUCTION AND CHECK THE RESULTS. A CALL
21291                              ;TO IT IS MADE THUS:
21292                              ;
21293                              ;               JSR     PC,@#LDCFSUB
21294                              ;               ACARG:  .WORD   X,X             ;AC OPERAND
21295                              ;               RES:    .WORD   X,X             ;EXPECTED RESULT
21296                              ;               ERRES:  .WORD   X,X             ;ERROR RESULT
21297                              ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
21298                              ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
21299                              ;               ERFPS:  .WORD   X               ;ERROR FPS
21300                              ;               ERR1:   ERROR   X               ;DATA ERROR
21301                              ;                       BR      CONT
21302                              ;               ERR2:   ERROR   X               ;FPS ERROR
21303                              ;               CONT:                           ;RETURN ADDRESS
21304                              ;
21305                              ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
21306                              ;THE LDCIF OR LDCLF INSTRUCTION IS EXECUTED.
21307                              ;THE RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
21308                              ;COMPARED WITH FPSA IF THIS TOO IS CORRECT LDCFSUB RETURNS CONTROL
21309                              ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD LDCFSUB WILL
21310                              ;COMPARE IT TO ERROR FPS. IF THIS MATCHES THEN LDCFSUB WILL RETURN
21311                              ;TO THE ERROR CALL AT ERR2, OTHERWISE LDCFSUB ITSELF
21312                              ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
21313                              ;LDCIF OR LDCLF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
21314                              ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
21315                              ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN LDCFSUB
21316                              ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR1. OTHERWISE THE
21317                              ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND LDCFSUB
21318                              ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
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21319
21320  116720  012601                  LDCFSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
21321  116722  016100  000014                  MOV     14(R1),R0       ;SET THE FPS.
21322  116726  170100                        LDFPS   R0
21323  116730  010100                        MOV     R1,R0
21324
21325  116732  177010                  1$:     LDCIF   (R0),AC0                ;TEST INSTRUCTION LDCIF OR LDCLF.
21326
21327  116734  170204                        STFPS   R4              ;GET FPS.
21328  116736  012700  117012                MOV     #LDCT,R0        ;GET THE RESULT.
21329  116742  012702  000200                MOV     #200,R2
21330  116746  170102                        LDFPS   R2
21331  116750  174010                        STD     AC0,(R0)
21332
21333  116752  012702  117012                MOV     #LDCT,R2        ;SEE IF THE RESULT WAS CORRECT.
21334  116756  010100                        MOV     R1,R0
21335  116760  062700  000004                ADD     #4,R0
21336  116764  012703  000002                MOV     #2,R3
21337  116770  022022                  2$:     CMP     (R0)+,(R2)+
21338  116772  001006                        BNE     10$             ;BR IF INCORRECT.
21339  116774  077303                        SOB     R3,2$
21340
21341  116776  026104  000016                CMP     16(R1),R4       ;SEE IF THE FPS WAS CORRECT.
21342  117002  001002                        BNE     10$             ;BR IF INCORRECT.
21343  117004  000161  000022          3$:     JMP     22(R1)          ;RETURN.
21344  117010                          10$:
21345  117010  104000                        EMT                     ;
21346
21347                                  ;DATA BUFFER:
21348  117012  000000  000000  000000  LDCT:   .WORD   0,0,0,0
21349  117020  000000
21350
21351  117022                          KKCDONE:
21352  117022  004767  005544                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21353                                                                  ;SEE IF THE USER HAS EXPRESSED
21354                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
21355                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21356                                                                  ;THE USER TYPED CONTROL G?).
21357
21358
21359                                  ;*****************************************************************************************
21360                                  ;TEST 570       LDCID AND LDCLD TEST
21361                                  ;*****************************************************************************************
21362  117026                          TS570:
21363                                  ;OPERAND=0      FL=0,   FD=1
21364  117026  004737  117504          LLC1:   JSR     PC,@#LDCDSUB    ;GO EXECUTE THE INSTRUCTION.
21365  117032  000000  000000          1$:     .WORD   0,0             ;FSRC OPERAND.
21366  117036  000000  000000  000000  2$:     .WORD   0,0,0,0         ;EXPECTED RESULT.
21367  117044  000000
21368  117046  177777  177777  177777  3$:     .WORD   -1,-1,-1,-1             ;ANTICIPATED ERRONEOUS RESULT.
21369  117054  177777
21370  117056  000213                  4$:     213                     ;FPS BEFORE EXECUTION.
21371  117060  000204                          204                     ;FPS AFTER EXECUTION.
21372  117062  177777                          -1                      ;ANTICIPATED ERRONEOUS FPS.
21373                                  ;OPERAND=0      FL=0,   FD=1
21374  117064  004737  117504          LLC2:   JSR     PC,@#LDCDSUB    ;GO EXECUTE THE INSTRUCTION.
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21375  117070  000000  177777          1$:     .WORD   0,-1                    ;FSRC OPERAND.
21376  117074  000000  000000  000000  2$:     .WORD   0,0,0,0                 ;EXPECTED RESULT.
21377  117102  000000
21378  117104  004177  177400  000000  3$:     .WORD   4177,177400,0,0                 ;ANTICIPATED ERRONEOUS RESULT.
21379  117112  000000
21380  117114  000200                  4$:     200                             ;FPS BEFORE EXECUTION.
21381  117116  000204                          204                             ;FPS AFTER EXECUTION.
21382  117120  177777                          -1                              ;ANTICIPATED ERRONEOUS FPS.
21383                                  ;OPERAND=0      FL=1    FD=1
21384  117122  004737  117504          LLC3:   JSR     PC,@#LDCDSUB            ;GO EXECUTE THE INSTRUCTION.
21385  117126  000000  000000          1$:     .WORD   0,0                     ;FSRC OPERAND.
21386  117132  000000  000000  000000  2$:     .WORD   0,0,0,0                 ;EXPECTED RESULT.
21387  117140  000000
21388  117142  177777  177777  177777  3$:     .WORD   -1,-1,-1,-1                     ;ANTICIPATED ERRONEOUS RESULT.
21389  117150  177777
21390  117152  000211                  4$:     211                             ;FPS BEFORE EXECUTION.
21391  117154  000204                          204                             ;FPS AFTER EXECUTION.
21392  117156  177777                          -1                              ;ANTICIPATED ERRONEOUS FPS.
21393                                  ;OPERAND=40000  FL=0    FD=1
21394  117160  004737  117504          LLC4:   JSR     PC,@#LDCDSUB            ;GO EXECUTE THE INSTRUCTION.
21395  117164  040000  000000          1$:     .WORD   40000,0                 ;FSRC OPERAND.
21396  117170  043600  000000  000000  2$:     .WORD   43600,0,0,0                     ;EXPECTED RESULT.
21397  117176  000000
21398  117200  047600  000000  000000  3$:     .WORD   47600,0,0,0                     ;ANTICIPATED ERRONEOUS RESULT.
21399  117206  000000
21400  117210  000217                  4$:     217                             ;FPS BEFORE EXECUTION.
21401  117212  000200                          200                             ;FPS AFTER EXECUTION.
21402  117214  177777                          -1                              ;ANTICIPATED ERRONEOUS FPS.
21403                                  ;OPERAND=-40000 FL=0    FD=1
21404  117216  004737  117504          LLC5:   JSR     PC,@#LDCDSUB            ;GO EXECUTE THE INSTRUCTION.
21405  117222  140000  000000          1$:     .WORD   -40000,0                        ;FSRC OPERAND.
21406  117226  143600  000000  000000  2$:     .WORD   143600,0,0,0                    ;EXPECTED RESULT.
21407  117234  000000
21408  117236  043600  000000  000000  3$:     .WORD   43600,0,0,0                     ;ANTICIPATED ERRONEOUS RESULT.
21409  117244  000000
21410  117246  000200                  4$:     200                             ;FPS BEFORE EXECUTION.
21411  117250  000210                          210                             ;FPS AFTER EXECUTION.
21412  117252  177777                          -1                              ;ANTICIPATED ERRONEOUS FPS.
21413                                  ;OPERAND=40000,0        FL=1    FD=1
21414  117254  004737  117504          LLC6:   JSR     PC,@#LDCDSUB            ;GO EXECUTE THE INSTRUCTION.
21415  117260  040000  000000          1$:     .WORD   40000,0                 ;FSRC OPERAND.
21416  117264  047600  000000  000000  2$:     .WORD   47600,0,0,0                     ;EXPECTED RESULT.
21417  117272  000000
21418  117274  043600  000000  000000  3$:     .WORD   43600,0,0,0                     ;ANTICIPATED ERRONEOUS RESULT.
21419  117302  000000
21420  117304  000317                  4$:     317                             ;FPS BEFORE EXECUTION.
21421  117306  000300                          300                             ;FPS AFTER EXECUTION.
21422  117310  177777                          -1                              ;ANTICIPATED ERRONEOUS FPS.
21423                                  ;OPERAND=0,1    FL=1    FD=1
21424  117312  004737  117504          LLC7:   JSR     PC,@#LDCDSUB            ;GO EXECUTE THE INSTRUCTION.
21425  117316  000000  000001          1$:     .WORD   0,1                     ;FSRC OPERAND.
21426  117322  040200  000000  000000  2$:     .WORD   40200,0,0,0                     ;EXPECTED RESULT.
21427  117330  000000
21428  117332  034200  000000  000000  3$:     .WORD   34200,0,0,0                     ;ANTICIPATED ERRONEOUS RESULT.
21429  117340  000000
21430  117342  000300                  4$:     300                             ;FPS BEFORE EXECUTION.
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21431  117344  000300                    300                     ;FPS AFTER EXECUTION.
21432  117346  177777                    -1                      ;ANTICIPATED ERRONEOUS FPS.
21433                                    ;OPERAND=77777,177777   FL=1    FD=1
21434  117350  004737  117504            LLC10:  JSR     PC,@#LDCDSUB    ;GO EXECUTE THE INSTRUCTION.
21435  117354  077777  177777            1$:     .WORD   77777,177777            ;FSRC OPERAND.
21436  117360  047777  177777  177000    2$:     .WORD   47777,177777,177000,0           ;EXPECTED RESULT.
21437  117366  000000
21438  117370  177777  177777  177777    3$:     .WORD   -1,-1,-1,-1             ;ANTICIPATED ERRONEOUS RESULT.
21439  117376  177777
21440  117400  000317                    4$:     317                     ;FPS BEFORE EXECUTION.
21441  117402  000300                            300                     ;FPS AFTER EXECUTION.
21442  117404  177777                            -1                      ;ANTICIPATED ERRONEOUS FPS.
21443                                    ;OPERAND=-PATTERN       FL=1    FD=1
21444
21445  117406  004767  000072            LLC11:  JSR     PC,LDCDSUB      ;GO EXECUTE THE INSTRUCTION.
21446  117412  177777  177526            1$:     .WORD   -1,-252         ;FSRC OPERAND.
21447  117416  142052  000000  000000    2$:     .WORD   142052,0,0,0            ;EXPECTED RESULT.
21448  117424  000000
21449  117426  136052  000000  000000    3$:     .WORD   136052,0,0,0            ;ANTICIPATED ERRONEOUS RESULT.
21450  117434  000000
21451  117436  000307                    4$:     307                     ;FPS BEFORE EXECUTION.
21452  117440  000310                            310                     ;FPS AFTER EXECUTION.
21453  117442  177777                            -1                      ;ANTICIPATED ERRONEOUS FPS.
21454                                    ;OPERAND=PATTERN        FL=1    FD=1    FT=1
21455  117444  004767  000034            LLC12:  JSR     PC,LDCDSUB      ;GO EXECUTE THE INSTRUCTION.
21456  117450  012345  067012            1$:     .WORD   12345,67012             ;FSRC OPERAND.
21457  117454  047247  025560  050000    2$:     .WORD   47247,025560,050000,0           ;EXPECTED RESULT.
21458  117462  000000
21459  117464  177777  177777  177777    3$:     .WORD   -1,-1,-1,-1             ;ANTICIPATED ERRONEOUS RESULT.
21460  117472  177777
21461  117474  000352                    4$:     352                     ;FPS BEFORE EXECUTION.
21462  117476  000340                            340                     ;FPS AFTER EXECUTION.
21463  117500  177777                            -1                      ;ANTICIPATED ERRONEOUS FPS.
21464  117502  000435                    6$:     BR      LLCDONE
21465
21466                                    ;THIS SUBROUTINE, LDCDSUB, IS USED TO SET UP THE OPERANDS, EXECUTE
21467                                    ;THE LDCID OR LDCLD INSTRUCTION AND CHECK THE RESULTS. A CALL
21468                                    ;TO IT IS MADE THUS:
21469                                    ;
21470                                    ;               JSR     PC,@#LDCDSUB
21471                                    ;               ACARG:  .WORD   X,X             ;AC OPERAND
21472                                    ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
21473                                    ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
21474                                    ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
21475                                    ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
21476                                    ;               ERFPS:  .WORD   X               ;ERROR FPS.
21477                                    ;               ERR1:   ERROR   X               ;DATA ERROR.
21478                                    ;                       BR      CONT
21479                                    ;               ERR2:   ERROR   X               ;FPS ERROR.
21480                                    ;               CONT:                           ;RETURN ADDRESS
21481                                    ;
21482                                    ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
21483                                    ;THE LDCID OR LDCLD INSTRUCTION IS EXECUTED.
21484                                    ;THE RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
21485                                    ;COMPARED WITH FPSA IF THIS TOO IS CORRECT LDCDSUB RETURNS CONTROL
21486                                    ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD LDCDSUB
```

```
21487                                   ;COMPARE IT TO ERROR FPS. IF THIS MATCHES THEN LDCDSUB WILL RETURN
21488                                   ;TO THE ERROR CALL AT ERR2, OTHERWISE LDCDSUB ITSELF
21489                                   ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
21490                                   ;LDCID OR LDCLD IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
21491                                   ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
21492                                   ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN LDCDSUB
21493                                   ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR1. OTHERWISE THE
21494                                   ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND LDCDSUB WILL
21495                                   ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
21496
21497  117504  012601                   LDCDSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
21498  117506  016100  000024                   MOV     24(R1),R0       ;SET THE FPS.
21499  117512  170100                           LDFPS   R0
21500  117514  010100                           MOV     R1,R0
21501  117516  177010                   1$:     LDCID   (R0),AC0        ;TEST INSTRUCTION, LDCID OR LDCLD.
21502
21503  117520  170204                           STFPS   R4              ;GET FPS.
21504  117522  012700  117012                   MOV     #LDCT,R0        ;GET THE RESULT.
21505  117526  012702  000200                   MOV     #200,R2
21506  117532  170102                           LDFPS   R2
21507  117534  174010                           STD     AC0,(R0)
21508
21509                                   ;SEE IF THE RESULT IS CORRECT.
21510  117536  012702  117012                   MOV     #LDCT,R2
21511  117542  010100                           MOV     R1,R0
21512  117544  062700  000004                   ADD     #4,R0
21513  117550  012703  000002                   MOV     #2,R3
21514  117554  022022                   2$:     CMP     (R0)+,(R2)+
21515  117556  001006                           BNE     10$             ;BR IF INCORRECT.
21516  117560  077303                           SOB     R3,2$
21517
21518  117562  026104  000026                   CMP     26(R1),R4               ;IS THE FPS CORRECT?
21519  117566  001002                           BNE     10$             ;BR IF INCORRECT.
21520  117570  000161  000032           3$:     JMP     32(R1)          ;RETURN.
21521  117574                           10$:
21522  117574  104000                           EMT                     ;
21523
21524  117576                           LLCDONE:
21525  117576  004767  004770                   JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21526                                                                   ;SEE IF THE USER HAS EXPRESSED
21527                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
21528                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21529                                                                   ;THE USER TYPED CONTROL G?).
21530
21531
21532                                   ;*****************************************************************************
21533                                   ;TEST 571       LDEXP TEST
21534                                   ;*****************************************************************************
21535  117602                           TS571:
21536
21537                                   ; NON-ZERO RES. VALID EXPON=210 (EXCESS 200)=10
21538  117602  004767  001136           MMC1:   JSR     PC,LDXSUB       ;GO EXECUTE THE INSTRUCTION.
21539  117606  012345  067012  034567   1$:     .WORD   12345,67012,34567,012345        ;AC0 OPERAND.
21540  117614  012345
21541  117616  000010                   2$:     .WORD   10              ;EXPONENT OPERAND.
21542  117620  042145  067012  034567   3$:     .WORD   42145,67012,34567,012345                ;EXPECTED RESULT.
```

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21543  117626  012345
21544  117630  002145  067012  034567  4$:     .WORD   2145,67012,34567,012345          ;ANTICIPATED ERRONEOUS RESULT.
21545  117636  012345
21546  117640  047217                  5$:     47217                   ;FPS BEFORE EXECUTION.
21547  117642  047200                          47200                   ;FPS AFTER EXECUTION.
21548  117644  147200                          147200                  ;ANTICIPATED ERRONEOUS FPS.
21549  117646  177777                          -1              ;EXPECTED FEC.
21550                                  ;NON-ZERO       RES     NEG.
21551  117650  004737  120744          MMC2:   JSR     PC,@#LDXSUB     ;EXPON=377
21552  117654  123456  070123  045670  1$:     .WORD   123456,70123,45670,123456       ;AC0 OPERAND.
21553  117662  123456
21554  117664  000177                  2$:     .WORD   177             ;EXPONENT OPERAND.
21555  117666  177656  070123  045670  3$:     .WORD   177656,70123,45670,123456               ;EXPECTED RESULT.
21556  117674  123456
21557  117676  137656  070123  045670  4$:     .WORD   137656,70123,45670,123456               ;ANTICIPATED ERRONEOUS RESULT.
21558  117704  123456
21559  117706  047207                  5$:     47207                   ;FPS BEFORE EXECUTION.
21560  117710  047210                          47210                   ;FPS AFTER EXECUTION.
21561  117712  147210                          147210                  ;ANTICIPATED ERRONEOUS FPS.
21562  117714  177777                          -1              ;EXPECTED FEC.
21563                                  ;NON-ZERO       RES,    EXP=256=(56)REAL
21564  117716  004737  120744          MMC3:   JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21565  117722  073261  057645  043323  1$:     .WORD   73261,057645,43323,101760       ;AC0 OPERAND.
21566  117730  101760
21567  117732  000056                  2$:     .WORD   56              ;EXPONENT OPERAND.
21568  117734  053461  057645  043323  3$:     .WORD   53461,057645,43323,101760               ;EXPECTED RESULT.
21569  117742  101760
21570  117744  177777  177777  177777  4$:     .WORD   -1,-1,-1,-1             ;ANTICIPATED ERRONEOUS RESULT.
21571  117752  177777
21572  117754  047200                  5$:     47200                   ;FPS BEFORE EXECUTION.
21573  117756  047200                          47200                   ;FPS AFTER EXECUTION.
21574  117760  147200                          147200                  ;ANTICIPATED ERRONEOUS FPS.
21575  117762  177777                          -1              ;EXPECTED FEC.
21576                                  ;EXP=27 (EXCESS 200)=-151 (OCT)
21577  117764  004737  120744          MMC4:   JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21578  117770  012223  024252  062720  1$:     .WORD   12223,24252,62720,21222 ;AC0 OPERAND.
21579  117776  021222
21580  120000  177627                  2$:     .WORD   -151            ;EXPONENT OPERAND.
21581  120002  005623  024252  062720  3$:     .WORD   5623,24252,62720,21222          ;EXPECTED RESULT.
21582  120010  021222
21583  120012  177777  177777  177777  4$:     .WORD   -1,-1,-1,-1             ;ANTICIPATED ERRONEOUS RESULT.
21584  120020  177777
21585  120022  047200                  5$:     47200                   ;FPS BEFORE EXECUTION.
21586  120024  047200                          47200                   ;FPS AFTER EXECUTION.
21587  120026  147200                          147200                  ;ANTICIPATED ERRONEOUS FPS.
21588  120030  177777                          -1              ;EXPECTED FEC.
21589                                  ;EXP=0 (EXCESS 200)=-200 (OCT), POSITIVE FRAC
21590                                  ; FIV=1
21591  120032  004737  120744          MMC5:   JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21592  120036  030131  032334  035363  1$:     .WORD   30131,32334,35363,73031 ;AC0 OPERAND.
21593  120044  073031
21594  120046  177600                  2$:     .WORD   -200            ;EXPONENT OPERAND.
21595  120050  000131  032334  035363  3$:     .WORD   00131,32334,35363,73031         ;EXPECTED RESULT.
21596  120056  073031
21597  120060  000000  000000  000000  4$:     .WORD   0,0,0,0         ;ANTICIPATED ERRONEOUS RESULT.
21598  120066  000000
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21599  120070  042200                  5$:     42200                   ;FPS BEFORE EXECUTION.
21600  120072  142204                          142204                  ;FPS AFTER EXECUTION.
21601  120074  042202                          42202                   ;ANTICIPATED ERRONEOUS FPS.
21602  120076  000012                          12              ;EXPECTED FEC.
21603                                  ;EXP=0  (EXCESS 200)=-200 (OCT), NEG FRACT,FIU=1
21604  120100  004737  120744          MMC6:   JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21605  120104  140414  024344  045464  1$:     .WORD   140414,24344,45464,74045        ;AC0 OPERAND.
21606  120112  074045
21607  120114  177600                  2$:     .WORD   -200            ;EXPONENT OPERAND.
21608  120116  100014  024344  045464  3$:     .WORD   100014,24344,45464,74045        ;-0             ;EXPECTED RESULT.
21609  120124  074045
21610  120126  000000  000000  000000  4$:     .WORD   0,0,0,0         ;ANTICIPATED ERRONEOUS RESULT.
21611  120134  000000
21612  120136  042200                  5$:     42200                   ;FPS BEFORE EXECUTION.
21613  120140  142214                          142214                  ;FPS AFTER EXECUTION.
21614  120142  042214                          42214                   ;ANTICIPATED ERRONEOUS FPS.
21615  120144  000012                          12              ;EXPECTED FEC.
21616                                  ;EXP=0 (EXCESS 200)=-200 (OCT),POS FRAC, FIU=0
21617
21618  120146  004737  120744          MMC7:   JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21619  120152  051525  035455  005675  1$:     .WORD   51525,35455,5675,05152  ;AC0 OPERAND.
21620  120160  005152
21621  120162  177600                  2$:     .WORD   -200            ;EXPONENT OPERAND.
21622  120164  000000  000000  000000  3$:     .WORD   0,0,0,0         ;EXPECTED RESULT.
21623  120172  000000
21624  120174  000125  035455  005675  4$:     .WORD   00125,35455,5675,05152          ;ANTICIPATED ERRONEOUS RESULT.
21625  120202  005152
21626  120204  045200                          45200                   ;FPS BEFORE EXECUTION.
21627  120206  045204                          45204                   ;FPS AFTER EXECUTION.
21628  120210  145204                          145204                  ;ANTICIPATED ERRONEOUS FPS.
21629  120212  177777                          -1              ;EXPECTED FEC.
21630                                  ;EXP=-1405 (EXCESS 200)=-1605 (OCT), FIU=1
21631  120214  004737  120744          MMC10:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21632  120220  061626  062636  046566  1$:     .WORD   61626,62636,46566,67606 ;AC0 OPERAND.
21633  120226  067606
21634  120230  176173                  2$:     .WORD   -1605           ;EXPONENT OPERAND.
21635  120232  076626  062636  046566  3$:     .WORD   76626,62636,46566,67606         ;EXPECTED RESULT.
21636  120240  067606
21637  120242  000000  000000  000000  4$:     .WORD   0,0,0,0         ;ANTICIPATED ERRONEOUS RESULT.
21638  120250  000000
21639  120252  042200                  5$:     42200                   ;FPS BEFORE EXECUTION.
21640  120254  142200                          142200                  ;FPS AFTER EXECUTION.
21641  120256  042204                          42204                   ;ANTICIPATED ERRONEOUS FPS.
21642  120260  000012                          12              ;EXPECTED FEC.
21643                                  ;EXP=-17416 (EXCESS 200)=-17616 (OCT), FIU=0
21644  120262  004737  120744          MMC11:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21645  120266  071727  037475  076777  1$:     .WORD   71727,37475,76777,17273 ;AC0 OPERAND.
21646  120274  017273
21647  120276  160162                  2$:     .WORD   -17616          ;EXPONENT OPERAND.
21648  120300  000000  000000  000000  3$:     .WORD   0,0,0,0         ;EXPECTED RESULT.
21649  120306  000000
21650  120310  074527  037475  076777  4$:     .WORD   74527,37475,76777,17273         ;ANTICIPATED ERRONEOUS RESULT.
21651  120316  017273
21652  120320  045200                  5$:     45200                   ;FPS BEFORE EXECUTION.
21653  120322  045204                          45204                   ;FPS AFTER EXECUTION.
21654  120324  145200                          145200                  ;ANTICIPATED ERRONEOUS FPS.
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21655  120326  177777                          -1                  ;EXPECTED FEC.
21656                                  ;EXP=-1601 (EXCESS 200)=-2001 (OCT), FIU=1
21657  120330  004737  120744          MMC12:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21658  120334  001020  030405  006070  1$:     .WORD   01020,30405,06070,00102 ;AC0 OPERAND.
21659  120342  000102
21660  120344  175777                  2$:     .WORD   -2001           ;EXPONENT OPERAND.
21661  120346  037620  030405  006070  3$:     .WORD   37620,30405,06070,00102         ;EXPECTED RESULT.
21662  120354  000102
21663  120356  000000  000000  000000  4$:     .WORD   0,0,0,0         ;ANTICIPATED ERRONEOUS RESULT.
21664  120364  000000
21665  120366  042200                  5$:     42200                   ;FPS BEFORE EXECUTION.
21666  120370  142200                          142200                  ;FPS AFTER EXECUTION.
21667  120372  042204                          42204                   ;ANTICIPATED ERRONEOUS FPS.
21668  120374  000012                          12              ;EXPECTED FEC.
21669                                  ;EXP=1206 (EXCESS 200)=1006 (OCT) FIV =1
21670  120376  004737  120744          MMC13:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21671  120402  012131  014151  016171  1$:     .WORD   12131,14151,16171,10111 ;AC0 OPERAND.
21672  120410  010111
21673  120412  001006                  2$:     .WORD   1006            ;EXPONENT OPERAND.
21674  120414  041531  014151  016171  3$:     .WORD   41531,14151,16171,10111         ;EXPECTED RESULT.
21675  120422  010111
21676  120424  000000  000000  000000  4$:     .WORD   0,0,0,0         ;ANTICIPATED ERRONEOUS RESULT.
21677  120432  000000
21678  120434  041200                  5$:     41200                   ;FPS BEFORE EXECUTION.
21679  120436  141202                          141202                  ;FPS AFTER EXECUTION.
21680  120440  041204                          41204                   ;ANTICIPATED ERRONEOUS FPS.
21681  120442  000010                          10              ;EXPECTED FEC.
21682                                  ;EXP=16315 (EXCESS 200)=16115 (OCT) FIV=0
21683  120444  004737  120744          MMC14:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21684  120450  027262  025242  023222  1$:     .WORD   27262,25242,23222,21202 ;AC0 OPERAND.
21685  120456  021202
21686  120460  016115                  2$:     .WORD   16115           ;EXPONENT OPERAND.
21687  120462  000000  000000  000000  3$:     .WORD   0,0,0,0         ;EXPECTED RESULT.
21688  120470  000000
21689  120472  063262  025242  023222  4$:     .WORD   63262,25242,23222,21202         ;ANTICIPATED ERRONEOUS RESULT.
21690  120500  021202
21691  120502  046200                  5$:     46200                   ;FPS BEFORE EXECUTION.
21692  120504  046206                          46206                   ;FPS AFTER EXECUTION.
21693  120506  146202                          146202                  ;ANTICIPATED ERRONEOUS FPS.
21694  120510  177777                          -1              ;EXPECTED FEC.
21695                                  ;EXP=11011 (EXCESS 200)=10611 (OCT) FIV=1
21696
21697  120512  004737  120744          MMC15:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21698  120516  030313  032333  034353  1$:     .WORD   30313,32333,34353,36373 ;AC0 OPERAND.
21699  120524  036373
21700  120526  010611                  2$:     .WORD   10611           ;EXPONENT OPERAND.
21701  120530  002313  032333  034353  3$:     .WORD   2313,32333,34353,36373          ;EXPECTED RESULT.
21702  120536  036373
21703  120540  000000  000000  000000  4$:     .WORD   0,0,0,0         ;ANTICIPATED ERRONEOUS RESULT.
21704  120546  000000
21705  120550  041200                  5$:     41200                   ;FPS BEFORE EXECUTION.
21706  120552  141202                          141202                  ;FPS AFTER EXECUTION.
21707  120554  041204                          41204                   ;ANTICIPATED ERRONEOUS FPS.
21708  120556  000010                          10              ;EXPECTED FEC.
21709                                  ;EXP=17123 (EXCESS 200)=16723 (OCT) FIV=0
21710
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21711  120560  004737  120744          MMC16:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21712  120564  040414  042434  044454  1$:     .WORD   40414,42434,44454,46474 ;AC0 OPERAND.
21713  120572  046474
21714  120574  016723                  2$:     .WORD   16723           ;EXPONENT OPERAND.
21715  120576  000000  000000  000000  3$:     .WORD   0,0,0,0         ;EXPECTED RESULT.
21716  120604  000000
21717  120606  024614  042434  044454  4$:     .WORD   24614,42434,44454,46474         ;ANTICIPATED ERRONEOUS RESULT.
21718  120614  046474
21719  120616  046200                  5$:     46200                   ;FPS BEFORE EXECUTION.
21720  120620  046206                          46206                   ;FPS AFTER EXECUTION.
21721  120622  146202                          146202                  ;ANTICIPATED ERRONEOUS FPS.
21722  120624  177777                          -1              ;EXPECTED FEC.
21723                                  ;EXP=   254 (OCT)=      454 (EXCESS 200)        FIV=1
21724
21725  120626  004737  120744          MMC17:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21726  120632  050515  052535  054555  1$:     .WORD   50515,52535,54555,56575 ;AC0 OPERAND.
21727  120640  056575
21728  120642  000254                  2$:     .WORD   254             ;EXPONENT OPERAND.
21729  120644  013115  052535  054555  3$:     .WORD   13115,52535,54555,56575         ;EXPECTED RESULT.
21730  120652  056575
21731  120654  000000  000000  000000  4$:     .WORD   0,0,0,0         ;ANTICIPATED ERRONEOUS RESULT.
21732  120662  000000
21733  120664  041200                  5$:     41200                   ;FPS BEFORE EXECUTION.
21734  120666  141202                          141202                  ;FPS AFTER EXECUTION.
21735  120670  041204                          41204                   ;ANTICIPATED ERRONEOUS FPS.
21736  120672  000010                          10              ;EXPECTED FEC.
21737                                  ;EXP=   313 (OCT)=      513(EXCESS 200) FIV=0
21738
21739  120674  004737  120744          MMC20:  JSR     PC,@#LDXSUB     ;GO EXECUTE THE INSTRUCTION.
21740  120700  060616  062636  064656  1$:     .WORD   60616,62636,64656,66676 ;AC0 OPERAND.
21741  120706  066676
21742  120710  000313                  2$:     .WORD   313             ;EXPONENT OPERAND.
21743  120712  000000  000000  000000  3$:     .WORD   0,0,0,0         ;EXPECTED RESULT.
21744  120720  000000
21745  120722  022616  062636  064656  4$:     .WORD   22616,62636,64656,66676         ;ANTICIPATED ERRONEOUS RESULT.
21746  120730  066676
21747  120732  046200                  5$:     46200                   ;FPS BEFORE EXECUTION.
21748  120734  046206                          46206                   ;FPS AFTER EXECUTION.
21749  120736  146202                          146202                  ;ANTICIPATED ERRONEOUS FPS.
21750  120740  177777                          -1              ;EXPECTED FEC.
21751  120742  000457                          BR      MMCDONE
21752
21753                                  ;THIS SUBROUTINE, LDXSUB, IS USED TO SET UP THE OPERANDS, EXECUTE
21754                                  ;THE LDEXP INSTRUCTION AND CHECK THE RESULTS. A CALL
21755                                  ;TO IT IS MADE THUS:
21756                                  ;
21757                                  ;               JSR     PC,@#LDXSUB
21758                                  ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
21759                                  ;               EXP:    .WORD   X               ;EXPONENT
21760                                  ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
21761                                  ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
21762                                  ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
21763                                  ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
21764                                  ;               ERFPS:  .WORD   X               ;ERROR FPS.
21765                                  ;               FEC:    .WORD   X               ;EXPECTED FEC
21766                                  ;               ERR1:   ERROR   X               ;DATA ERROR.
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21767                                   ;                       BR      CONT
21768                                   ;               ERR2:   ERROR   X               ;FPS ERROR.
21769                                   ;               CONT:                           ;RETURN ADDRESS
21770                                   ;
21771                                   ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
21772                                   ;THE LDEXP INSTRUCTION IS EXECUTED.
21773                                   ;THE RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
21774                                   ;COMPARED WITH FPSA IF THIS TOO IS CORRECT LDXSUB RETURNS CONTROL
21775                                   ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD LDXSUB
21776                                   ;COMPARE IT TO ERROR FPS. IF THIS MATCHES THEN LDXSUB WILL RETURN
21777                                   ;TO THE ERROR CALL AT ERR2, OTHERWISE LDXSUB ITSELF
21778                                   ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
21779                                   ;LDEXP IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
21780                                   ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
21781                                   ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN LDXSUB
21782                                   ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR1. OTHERWISE THE
21783                                   ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND LDXSUB WILL
21784                                   ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
21785
21786  120744  012601                   LDXSUB: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
21787  120746  012700  000200                   MOV     #200,R0         ;LOAD THE AC0 OPERAND.
21788  120752  170100                           LDFPS   R0
21789  120754  010100                           MOV     R1,R0
21790  120756  172410                           LDD     (R0),AC0
21791  120760  016100  000032                   MOV     32(R1),R0       ;SET UP THE FPS.
21792  120764  170100                           LDFPS   R0
21793  120766  010100                           MOV     R1,R0
21794  120770  062700  000010                   ADD     #10,R0
21795
21796  120774  176410                   1$:     LDEXP   (R0),AC0        ;TEST INSTRUCTION.
21797
21798  120776  170204                           STFPS   R4              ;GET THE FPS.
21799  121000  170305                           STST    R5              ;GET THE FEC.
21800  121002  012700  000200                   MOV     #200,R0         ;GET THE RESULT.
21801  121006  170100                           LDFPS   R0
21802  121010  012700  121072                   MOV     #LDXT,R0
21803  121014  174010                           STD     AC0,(R0)
21804  121016  012702  121072                   MOV     #LDXT,R2        ;SEE IF THE RESULT WAS CORRECT.
21805  121022  010103                           MOV     R1,R3
21806  121024  062703  000012                   ADD     #12,R3
21807  121030  012700  000004                   MOV     #4,R0
21808  121034  022223                   2$:     CMP     (R2)+,(R3)+
21809  121036  001014                           BNE     10$             ;BRANCH IF NOT CORRECT.
21810  121040  077003                           SOB     R0,2$
21811  121042  020461  000034                   CMP     R4,34(R1)       ;SEE IF THE FPS WAS CORRECT.
21812  121046  001010                           BNE     10$             ;BRANCH IF NOT CORRECT.
21813  121050  005761  000034                   TST     34(R1)
21814  121054  100003                           BPL     3$
21815  121056  020561  000040                   CMP     R5,40(R1)       ;SEE IF THE FEC WAS CORRECT.
21816  121062  001002                           BNE     10$             ;BRANCH IF NOT CORRECT.
21817
21818  121064  000161  000042           3$:     JMP     42(R1)          ;RETURN.
21819  121070                           10$:
21820  121070  104000                           EMT                     ;
21821
21822                                   ;DATA BUFFER:
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21823  121072  000000  000000  000000  LDXT:   .WORD   0,0,0,0
21824  121100  000000
21825
21826  121102                          MMCDONE:
21827  121102  004767  003464                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
21828                                                                  ;SEE IF THE USER HAS EXPRESSED
21829                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
21830                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21831                                                                  ;THE USER TYPED CONTROL G?).
21832
21833
21834
21835                                  ;*****************************************************************************
21836                                  ;TEST 572       DESTINATION MODES, MODE 1 (FL=0), TEST
21837                                  ;*****************************************************************************
21838  121106                          TS572:
21839
21840
21841  121106  012700  121176                  MOV     #NNCTB0,R0      ;SET UP THE DATA BUFFER.
21842  121112  012701  000006                  MOV     #6,R1
21843  121116  012720  177777          1$:     MOV     #-1,(R0)+
21844  121122  077103                          SOB     R1,1$
21845  121124  012700  102345                  MOV     #102345,R0
21846  121130  012737  121212  000004          MOV     #NNC10,@#ERRVECT ;SET UP FOR TRAPS TO 4.
21847  121136  170100                          LDFPS   R0              ;SET UP FPS.
21848  121140  012700  121202                  MOV     #NNCTB1,R0
21849
21850  121144  170210                  NNC2:   STFPS   (R0)            ;TEST INSTRUCTION.
21851  121146  020027  121202                  CMP     R0,#NNCTB1      ;IS R0 CORRECT?
21852  121152  001017                          BNE     NNC10           ;BRANCH IF NOT CORRECT.
21853  121154  023727  121202  102345          CMP     @#NNCTB1,#102345   ;IS RESULT CORRECT?
21854  121162  001013                          BNE     NNC10           ;BRANCH IF NOT CORRECT.
21855  121164  023727  121204  177777          CMP     @#NNCTB1+2,#-1  ;IS THE RESULT CORRECT?
21856  121172  001007                          BNE     NNC10           ;BRANCH IF NOT CORRECT.
21857  121174  000407                          BR      NNCDONE
21858
21859                                  ;TEST DATA BUFFER:
21860  121176  177777  177777          NNCTB0: .WORD   -1,-1
21861  121202  177777  177777  177777  NNCTB1: .WORD   -1,-1,-1,-1
21862  121210  177777
21863  121212                          NNC10:
21864  121212  104000                          EMT                     ;
21865
21866  121214                          NNCDONE:
21867  121214  004767  003352                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
21868                                                                  ;SEE IF THE USER HAS EXPRESSED
21869                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
21870                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21871                                                                  ;THE USER TYPED CONTROL G?).
21872
21873
21874                                  ;*****************************************************************************
21875                                  ;TEST 573       DESTINATION MODES, MODE 2 (FL=0), TEST
21876                                  ;*****************************************************************************
21877  121220                          TS573:
21878
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21879
21880  121220  012700  121310           MOV     #OOCTB0,R0      ;SET UP THE DATA BUFFER.
21881  121224  012701  000006           MOV     #6,R1
21882  121230  012720  177777     1$:   MOV     #-1,(R0)+
21883  121234  077103                   SOB     R1,1$
21884  121236  012700  105412           MOV     #105412,R0
21885  121242  012737  121324  000004   MOV     #OOC10,@#ERRVECT  ;SET UP FOR TRAPS TO VECTOR 4.
21886  121250  170100                   LDFPS   R0              ;SET UP FPS.
21887  121252  012700  121314           MOV     #OOCTB1,R0
21888
21889  121256  170220           OOC2:   STFPS   (R0)+           ;TEST INSTRUCTION.
21890  121260  020027  121316           CMP     R0,#OOCTB1+2    ;IS R0 CORRECT?
21891  121264  001017                   BNE     OOC10           ;BRANCH IF NOT CORRECT.
21892  121266  023727  121314  105412   CMP     @#OOCTB1,#105412  ;IS THE RESULT CORRECT?
21893  121274  001013                   BNE     OOC10           ;BRANCH IF NOT CORRECT.
21894  121276  023727  121316  177777   CMP     @#OOCTB1+2,#-1  ;IS THE RESULT CORRECT?
21895  121304  001007                   BNE     OOC10           ;BRANCH IF NOT CORRECT.
21896  121306  000407                   BR      OOCDONE
21897
21898                           ;TEST DATA BUFFER:
21899  121310  177777  177777   OOCTB0: .WORD   -1,-1
21900  121314  177777  177777  177777 OOCTB1: .WORD   -1,-1,-1,-1
21901  121322  177777
21902  121324                   OOC10:
21903  121324  104000                   EMT                     ;
21904
21905  121326                   OOCDONE:
21906  121326  004767  003240           JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21907                                                           ;SEE IF THE USER HAS EXPRESSED
21908                                                           ;THE DESIRE TO CHANGE THE SOFTWARE
21909                                                           ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21910                                                           ;THE USER TYPED CONTROL G?).
21911
21912
21913
21914                           ;*****************************************************************************
21915                           ;TEST 574       DESTINATION MODES, MODE 4 (FL=0), TEST
21916                           ;*****************************************************************************
21917  121332                   TS574:
21918
21919  121332  012700  121422           MOV     #PPCTB0,R0      ;SET UP THE DATA BUFFER.
21920  121336  012701  000006           MOV     #6,R1
21921  121342  012720  177777     1$:   MOV     #-1,(R0)+
21922  121346  077103                   SOB     R1,1$
21923  121350  012700  105555           MOV     #105555,R0
21924  121354  012737  121436  000004   MOV     #PPC10,@#ERRVECT  ;SET UP FOR TRAPS TO VECTOR 4.
21925  121362  170100                   LDFPS   R0              ;SET UP FPS.
21926  121364  012700  121430           MOV     #PPCTB1+2,R0
21927
21928  121370  170240           PPC2:   STFPS   -(R0)           ;TEST INSTRUCTION.
21929  121372  020027  121426           CMP     R0,#PPCTB1      ;IS R0 CORRECT?
21930  121376  001017                   BNE     PPC10           ;BRANCH IF NOT CORRECT.
21931  121400  023727  121426  105555   CMP     @#PPCTB1,#105555  ;IS THE RESULT CORRECT?
21932  121406  001013                   BNE     PPC10           ;BRANCH IF NOT CORRECT.
21933  121410  023727  121430  177777   CMP     @#PPCTB1+2,#-1  ;IS THE RESULT CORRECT?
21934  121416  001007                   BNE     PPC10           ;BRANCH IF NOT CORRECT.
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21935  121420  000407                          BR      PPCDONE
21936
21937                                          ;TEST DATA BUFFER:
21938  121422  177777  177777                  PPCTB0: .WORD   -1,-1
21939  121426  177777  177777  177777          PPCTB1: .WORD   -1,-1,-1,-1
21940  121434  177777
21941  121436                                  PPC10:
21942  121436  104000                          EMT                     ;
21943  121440                                  PPCDONE:
21944  121440  004767  003126                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21945                                                                  ;SEE IF THE USER HAS EXPRESSED
21946                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
21947                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21948                                                                  ;THE USER TYPED CONTROL G?).
21949
21950
21951
21952                                          ;*****************************************************************************
21953                                          ;TEST 575       DESTINATION MODES, MODE 3 (FL=0), TEST
21954                                          ;*****************************************************************************
21955  121444                                  TS575:
21956
21957  121444  012700  121540                  MOV     #QQCTB0,R0      ;SET UP THE DATA BUFFER.
21958  121450  012701  000010                  MOV     #10,R1
21959  121454  012720  177777          1$:     MOV     #-1,(R0)+
21960  121460  077103                          SOB     R1,1$
21961  121462  012700  106653                  MOV     #106653,R0
21962  121466  012737  121560  000004          MOV     #QQC10,@#ERRVECT  ;SET UP FOR TRAPS TO VECTOR 4.
21963  121474  170100                          LDFPS   R0              ;SET UP FPS.
21964  121476  012700  121554                  MOV     #QQCTB2,R0
21965  121502  012710  121544                  MOV     #QQCTB1,(R0)
21966
21967  121506  170230                  QQC2:   STFPS   @(R0)+          ;TEST INSTRUCTION.
21968  121510  020027  121556                  CMP     R0,#QQCTB2+2    ;IS R0 CORRECT?
21969  121514  001021                          BNE     QQC10           ;BRANCH IF NOT CORRECT.
21970  121516  023727  121544  106653          CMP     @#QQCTB1,#106653  ;IS THE RESULT CORRECT?
21971  121524  001015                          BNE     QQC10           ;BRANCH IF NOT CORRECT.
21972  121526  023727  121554  121544          CMP     @#QQCTB2,#QQCTB1  ;IS THE RESULT CORRECT?
21973  121534  001011                          BNE     QQC10           ;BRANCH IF NOT CORRECT.
21974  121536  000411                          BR      QQCDONE
21975
21976                                          ;TEST DATA BUFFER:
21977  121540  177777  177777                  QQCTB0: .WORD   -1,-1
21978  121544  177777  177777  177777          QQCTB1: .WORD   -1,-1,-1,-1
21979  121552  177777
21980  121554  177777  177777                  QQCTB2: .WORD   -1,-1
21981  121560                                  QQC10:
21982  121560  104000                          EMT                     ;
21983  121562                                  QQCDONE:
21984  121562  004767  003004                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
21985                                                                  ;SEE IF THE USER HAS EXPRESSED
21986                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
21987                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
21988                                                                  ;THE USER TYPED CONTROL G?).
21989
21990
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```
                                ;*****************************************************************************************
                                ;TEST 576       DESTINATION MODES, MODE 5 (FL=0), TEST
                                ;*****************************************************************************************
121566                          TS576:

121566  012700  121664                MOV     #RRCTB0,R0      ;SET UP THE DATA BUFFER.
121572  012701  000006                MOV     #6,R1
121576  012720  177777        1$:     MOV     #-1,(R0)+
121602  077103                        SOB     R1,1$
121604  012700  004301                MOV     #004301,R0
121610  012737  121704  000004        MOV     #RRC10,@#ERRVECT  ;SET UP FOR TRAPS TO VECTOR 4.
121616  170100                        LDFPS   R0              ;SET UP FPS.
121620  012700  121702                MOV     #RRCTB2+2,R0
121624  012760  121670  177776        MOV     #RRCTB1,-2(R0)

121632  170250                RRC2:   STFPS   @-(R0)          ;TEST INSTRUCTION.
121634  020027  121700                CMP     R0,#RRCTB2      ;IS R0 CORRECT?
121640  001021                        BNE     RRC10           ;BRANCH IF NOT CORRECT.
121642  023727  121670  004301        CMP     @#RRCTB1,#004301  ;IS THE RESULT CORRECT?
121650  001015                        BNE     RRC10           ;BRANCH IF NOT CORRECT.
121652  023727  121700  121670        CMP     @#RRCTB2,#RRCTB1  ;IS THE RESULT CORRECT?
121660  001011                        BNE     RRC10           ;BRANCH IF NOT CORRECT.
121662  000411                        BR      RRCDONE

                                ;TEST DATA BUFFER:
121664  177777  177777        RRCTB0: .WORD   -1,-1
121670  177777  177777  177777RRCTB1: .WORD   -1,-1,-1,-1
121676  177777
121700  177777  177777        RRCTB2: .WORD   -1,-1
121704                          RRC10:
121704  104000                        EMT                     ;
121706                          RRCDONE:
121706  004767  002660                JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                ;THE USER TYPED CONTROL G?).


                                ;*****************************************************************************************
                                ;TEST 577       DESTINATION MODES, MODE 6 (FL=0), TEST
                                ;*****************************************************************************************
121712                          TS577:

121712  012700  122014                MOV     #SSCTB0,R0      ;SET UP THE DATA BUFFER.
121716  012701  000006                MOV     #6,R1
121722  012720  177777        1$:     MOV     #-1,(R0)+
121726  077103                        SOB     R1,1$
121730  012700  102514                MOV     #102514,R0
121734  012737  122030  000004        MOV     #SSC10,@#ERRVECT  ;SET UP FOR TRAPS TO VECTOR 4.
121742  170100                        LDFPS   R0              ;SET UP FPS.
121744  005001                        CLR     R1
121746  012700  114617                MOV     #SSCTB1-5201,R0
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22047
22048  121752  170260  005201          SSC2:   STFPS   5201(R0)                 ;TEST INSTRUCTION.
22049  121756  020127  000000                  CMP     R1,#0           ;WAS PC CORRECT AFTER EXECUTION?
22050  121762  001022                          BNE     SSC10           ;BRANCH IF NOT CORRECT.
22051  121764  020027  114617                  CMP     R0,#SSCTB1-5201 ;IS R0 CORRECT?
22052  121770  001017                          BNE     SSC10           ;BRANCH IF NOT CORRECT.
22053  121772  023727  122020  102514          CMP     @#SSCTB1,#102514  ;IS THE RESULT CORRECT?
22054  122000  001013                          BNE     SSC10           ;BRANCH IF NOT CORRECT.
22055  122002  023727  122022  177777          CMP     @#SSCTB1+2,#-1  ;IS THE RESULT CORRECT?
22056  122010  001007                          BNE     SSC10           ;BRANCH IF NOT CORRECT.
22057  122012  000407                          BR      SSCDONE
22058
22059                                  ;TEST DATA BUFFER:
22060  122014  177777  177777          SSCTB0: .WORD   -1,-1
22061  122020  177777  177777  177777  SSCTB1: .WORD   -1,-1,-1,-1
22062  122026  177777
22063  122030                          SSC10:
22064  122030  104000                          EMT                     ;
22065  122032                          SSCDONE:
22066  122032  004767  002534                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
22067                                                                  ;SEE IF THE USER HAS EXPRESSED
22068                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
22069                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
22070                                                                  ;THE USER TYPED CONTROL G?).
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22071
22072
22073                                   ;*****************************************************************************************
22074                                   ;TEST 600       DESTINATION MODES, MODE 7 (FL=0), TEST
22075                                   ;*****************************************************************************************
22076  122036                           TS600:
22077
22078  122036  012700  122146                   MOV     #TTCTB0,R0      ;SET UP THE DATA BUFFER.
22079  122042  012701  000010                   MOV     #10,R1
22080  122046  012720  177777           1$:     MOV     #-1,(R0)+
22081  122052  077103                           SOB     R1,1$
22082  122054  012700  103747                   MOV     #103747,R0
22083  122060  012737  122166  000004           MOV     #TTC10,@#ERRVECT  ;SET UP FOR TRAPS TO VECTOR 4.
22084  122066  170100                           LDFPS   R0              ;SET UP FPS.
22085  122070  005001                           CLR     R1
22086  122072  012700  114761                   MOV     #TTCTB2-5201,R0
22087  122076  012760  122152  005201           MOV     #TTCTB1,5201(R0)
22088
22089  122104  170270  005201           TTC2:   STFPS   @5201(R0)               ;TEST INSTRUCTION.
22090  122110  022701  000000                   CMP     #0,R1           ;WAS PC CORRECT AFTER EXECUTION?
22091  122114  001024                           BNE     TTC10           ;BRANCH IF NOT CORRECT.
22092  122116  020027  114761                   CMP     R0,#TTCTB2-5201 ;IS R0 CORRECT?
22093  122122  001021                           BNE     TTC10           ;BRANCH IF NOT CORRECT.
22094  122124  023727  122152  103747           CMP     @#TTCTB1,#103747  ;IS THE RESULT CORRECT?
22095  122132  001015                           BNE     TTC10           ;BRANCH IF NOT CORRECT.
22096  122134  023727  122154  177777           CMP     @#TTCTB1+2,#-1  ;IS THE RESULT CORRECT?
22097  122142  001011                           BNE     TTC10           ;BRANCH IF NOT CORRECT.
22098  122144  000411                           BR      TTCDONE
22099
22100                                   ;TEST DATA BUFFER:
22101  122146  177777  177777           TTCTB0: .WORD   -1,-1
22102  122152  177777  177777  177777   TTCTB1: .WORD   -1,-1,-1,-1
22103  122160  177777
22104  122162  177777  177777           TTCTB2: .WORD   -1,-1
22105  122166                           TTC10:
22106  122166  104000                           EMT                     ;
22107  122170                           TTCDONE:
22108  122170  004767  002376                   JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
22109                                                                   ;SEE IF THE USER HAS EXPRESSED
22110                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
22111                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
22112                                                                   ;THE USER TYPED CONTROL G?).
22113
22114                                   ;*****************************************************************************************
22115                                   ;TEST 601       DESTINATION MODES, MODE 2 (FL=1), TEST
22116                                   ;*****************************************************************************************
22117  122174                           TS601:
22118  122174  012700  000300                   MOV     #300,R0         ;SET UP FPS.
22119  122200  170100                           LDFPS   R0
22120  122202  012700  122226                   MOV     #UUCTP1,R0      ;SET UP THE AC0 OPERAND.
22121  122206  172410                           LDD     (R0),AC0
22122  122210  012700  122240                   MOV     #UUCBF0,R0
22123
22124  122214  175420                   UUC2:   STCDL   AC0,(R0)+       ;TEST INSTRUCTION.
22125
22126  122216  020027  122244                   CMP     R0,#UUCBF0+4    ;IS R0 CORRECT?
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22127  122222  001411                          BEQ     UUCDONE
22128  122224  104000                          EMT                     ;
22129                                  ;TEST DATA BUFFER:
22130  122226  000000  000000  000000  UUCTP1: .WORD   0,0,0,0
22131  122234  000000
22132  122236  177777                          -1
22133  122240  177777  177777  177777  UUCBF0: .WORD   -1,-1,-1
22134
22135  122246                          UUCDONE:
22136  122246  004767  002320                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
22137                                                                  ;SEE IF THE USER HAS EXPRESSED
22138                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
22139                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
22140                                                                  ;THE USER TYPED CONTROL G?).
22141
22142                          ;*****************************************************************************
22143                          ;TEST 602       DESTINATION MODES, MODE 4 (FL=1), TEST
22144                          ;*****************************************************************************
22145  122252                  TS602:
22146
22147  122252  012700  000300                  MOV     #300,R0         ;SET UP FPS.
22148  122256  170100                          LDFPS   R0
22149  122260  012700  122304                  MOV     #VVCTP1,R0      ;SET UP THE AC0 OPERAND.
22150  122264  172410                          LDD     (R0),AC0
22151  122266  012700  122322                  MOV     #VVCBF0+4,R0
22152
22153  122272  175440                  VVC2:   STCDL   AC0,-(R0)               ;TEST INSTRUCTION.
22154
22155  122274  020027  122316                  CMP     R0,#VVCBF0      ;IS R0 CORRECT?
22156  122300  001411                          BEQ     VVCDONE
22157  122302  104000                          EMT                     ;
22158                                  ;TEST DATA BUFFER:
22159  122304  000000  000000  000000  VVCTP1: .WORD   0,0,0,0
22160  122312  000000
22161  122314  177777                          -1
22162  122316  177777  177777  177777  VVCBF0: .WORD   -1,-1,-1
22163
22164  122324                          VVCDONE:
22165  122324  004767  002242                  JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
22166                                                                  ;SEE IF THE USER HAS EXPRESSED
22167                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
22168                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
22169                                                                  ;THE USER TYPED CONTROL G?).
22170
22171                          ;*****************************************************************************
22172                          ;TEST 603       STCDI AND STCDL TEST
22173                          ;*****************************************************************************
22174  122330                  TS603:
22175
22176                          ;FIRST TEST STC WITH EXP=100 (EXCESS 200)
22177  122330  004737  123266  WWC1:   JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22178  122334  020000  000000  000000  1$:     .WORD   20000,0,0,0     ;AC0 OPERAND.
22179  122342  000000
22180  122344  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
22181  122350  177777  177777          3$:     .WORD   -1,-1           ;ERROR RES.
22182  122354  040300                  4$:     40300                   ;FPS BEFORE EXECUTION.
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22183  122356  040304                          40304                   ;FPS AFTER EXECUTION.
22184  122360  140304                          140304                  ;ANTICIPATED ERRONEOUS FPS.
22185  122362  177777                          -1              ;REPORT RESULT INCORRECT.
22186                                  ;EXP=0 (OCT)    FL=1    FIC=0
22187  122364  004737  123266          WWC2:   JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22188  122370  040000  000000  000000  1$:     .WORD   40000,0,0,0     ;AC     ;AC0 OPERAND.
22189  122376  000000
22190  122400  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
22191  122404  177777  177777          3$:     .WORD   -1,-1           ;ANTICIPATED ERRONEOUS RESULT.
22192  122410  040313                  4$:     40313                   ;FPS BEFORE EXECUTION.
22193  122412  040304                          40304                   ;FPS AFTER EXECUTION.
22194  122414  140304                          140304                  ;ANTICIPATED ERRONEOUS FPS.
22195  122416  177777                          -1              ;EXPECTED FEC.
22196                                  ;EXP=37 (OCT)    FL=1    FIC=1
22197  122420  004737  123266          WWC3:   JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22198  122424  047667  075757  157737  1$:     .WORD   47667,75757,157737,167773       ;AC0 OPERAND.
22199  122432  167773
22200  122434  055675  173757          2$:     .WORD   55675,173757            ;EXPECTED RESULT.
22201  122440  122102  004021          3$:     .WORD   122102,004021           ;ANTICIPATED ERRONEOUS RESULT.
22202  122444  040717                  4$:     40717                   ;FPS BEFORE EXECUTION.
22203  122446  040700                          40700                   ;FPS AFTER EXECUTION.
22204  122450  140705                          140705                  ;ANTICIPATED ERRONEOUS FPS.
22205  122452  177777                          -1              ;EXPECTED FEC.
22206                                  ;EXP=40 (OCT)    FL=1    FIC=1
22207  122454  004737  123266          WWC4:   JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22208  122460  050000  000000  000000  1$:     .WORD   50000,0,0,0     ;AC0 OPERAND.
22209  122466  000000
22210  122470  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
22211  122474  177777  177777          3$:     .WORD   -1,-1           ;ANTICIPATED ERRONEOUS RESULT.
22212  122500  040700                  4$:     40700                   ;FPS BEFORE EXECUTION.
22213  122502  140705                          140705                  ;FPS AFTER EXECUTION.
22214  122504  040705                          40705                   ;ANTICIPATED ERRONEOUS FPS.
22215  122506  000006                          6               ;EXPECTED FEC.
22216
22217                                  ;EXP=40 (OCT)    FL=1    FIC=0
22218  122510  004737  123266          WWC5:   JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22219  122514  050000  000000  000000  1$:     .WORD   50000,0,0,0     ;AC0 OPERAND.
22220  122522  000000
22221  122524  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
22222  122530  177777  177777          3$:     .WORD   -1,-1           ;ANTICIPATED ERRONEOUS RESULT.
22223  122534  040312                  4$:     40312                   ;FPS BEFORE EXECUTION.
22224  122536  040305                          40305                   ;FPS AFTER EXECUTION.
22225  122540  140305                          140305                  ;ANTICIPATED ERRONEOUS FPS.
22226  122542  177777                          -1              ;EXPECTED FEC.
22227                                  ;EXP=30 (OCT)    FL=1    FIC=1
22228  122544  004737  123266          WWC6:   JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22229  122550  046000  000001  000000  1$:     .WORD   46000,1,0,0     ;AC0 OPERAND.
22230  122556  000000
22231  122560  000200  000001          2$:     .WORD   200,1           ;EXPECTED RESULT.
22232  122564  177777  177777          3$:     .WORD   -1,-1           ;ANTICIPATED ERRONEOUS RESULT.
22233  122570  040700                  4$:     40700                   ;FPS BEFORE EXECUTION.
22234  122572  040700                          40700                   ;FPS AFTER EXECUTION.
22235  122574  177777                          -1                      ;ANTICIPATED ERRONEOUS FPS.
22236  122576  177777                          -1              ;EXPECTED FEC.
22237                                  ;EXP=27 (OCT)    FL=1    FIC=1
22238  122600  004737  123266          WWC7:   JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
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22239  122604  045600  000001  000000  1$:     .WORD   45600,1,0,0      ;AC0 OPERAND.
22240  122612  000000
22241  122614  000100  000000          2$:     .WORD   100,0             ;EXPECTED RESULT.
22242  122620  177777  177777          3$:     .WORD   -1,-1             ;ANTICIPATED ERRONEOUS RESULT.
22243  122624  040707                  4$:     40707                     ;FPS BEFORE EXECUTION.
22244  122626  040700                          40700                     ;FPS AFTER EXECUTION.
22245  122630  177777                          -1                        ;ANTICIPATED ERRONEOUS FPS.
22246  122632  177777                          -1              ;EXPECTED FEC.
22247                                  ;EXP=17 (OCT)   FL=0    FIC=1
22248  122634  004737  123266          WWC10:  JSR     PC,@#STCSUB       ;GO EXECUTE THE INSTRUCTION.
22249  122640  043600  000000  000000  1$:     .WORD   43600,0,0,0       ;AC0 OPERAND.
22250  122646  000000
22251  122650  040000  177777          2$:     .WORD   40000,-1                  ;EXPECTED RESULT.
22252  122654  000000  177777          3$:     .WORD   0,-1              ;ANTICIPATED ERRONEOUS RESULT.
22253  122660  040600                  4$:     40600                     ;FPS BEFORE EXECUTION.
22254  122662  040600                          40600                     ;FPS AFTER EXECUTION.
22255  122664  140604                          140604                    ;ANTICIPATED ERRONEOUS FPS.
22256  122666  177777                          -1              ;EXPECTED FEC.
22257
22258                                  ;EXP=20 (OCT)   FL=0    FIC=1
22259  122670  004737  123266          WWC11:  JSR     PC,@#STCSUB       ;GO EXECUTE THE INSTRUCTION.
22260  122674  044000  000000  000000  1$:     .WORD   44000,0,0,0       ;AC0 OPERAND.
22261  122702  000000
22262  122704  000000  177777          2$:     .WORD   0,-1              ;EXPECTED RESULT.
22263  122710  177777  177777          3$:     .WORD   -1,-1             ;ANTICIPATED ERRONEOUS RESULT.
22264  122714  040600                  4$:     40600                     ;FPS BEFORE EXECUTION.
22265  122716  140605                          140605                    ;FPS AFTER EXECUTION.
22266  122720  040600                          40600                     ;ANTICIPATED ERRONEOUS FPS.
22267  122722  000006                          6               ;EXPECTED FEC.
22268                                  ;EXP=10 (OCT), AC NEGATIVE, FL=0, FIC=1
22269  122724  004737  123266          WWC12:  JSR     PC,@#STCSUB       ;GO EXECUTE THE INSTRUCTION.
22270  122730  142000  000000  000000  1$:     .WORD   142000,0,0,0      ;AC0 OPERAND.
22271  122736  000000
22272  122740  177600  177777          2$:     .WORD   177600,-1                 ;EXPECTED RESULT.
22273  122744  000200  000000          3$:     .WORD   200,0             ;ANTICIPATED ERRONEOUS RESULT.
22274  122750  040600                  4$:     40600                     ;FPS BEFORE EXECUTION.
22275  122752  040610                          40610                     ;FPS AFTER EXECUTION.
22276  122754  040600                          40600                     ;ANTICIPATED ERRONEOUS FPS.
22277  122756  177777                          -1              ;EXPECTED FEC.
22278                                  ;EXP=37 (OCT), FL=1, FIC=1, AC NEG.
22279  122760  004737  123266          WWC13:  JSR     PC,@#STCSUB       ;GO EXECUTE THE INSTRUCTION.
22280  122764  147600  000000  000000  1$:     .WORD   147600,0,0,0      ;AC0 OPERAND.
22281  122772  000000
22282  122774  140000  000000          2$:     .WORD   140000,0                  ;EXPECTED RESULT.
22283  123000  137777  000000          3$:     .WORD   137777,0                  ;ANTICIPATED ERRONEOUS RESULT.
22284  123004  040700                  4$:     40700                     ;FPS BEFORE EXECUTION.
22285  123006  040710                          40710                     ;FPS AFTER EXECUTION.
22286  123010  177777                          -1                        ;ANTICIPATED ERRONEOUS FPS.
22287  123012  177777                          -1              ;EXPECTED FEC.
22288                                  ;EXP=37  (OCT),  FL=1,  FIC=1,  AC  NEG
22289  123014  004737  123266          WWC14:  JSR     PC,@#STCSUB       ;GO EXECUTE THE INSTRUCTION.
22290  123020  147600  000000  001000  1$:     .WORD   147600,0,1000,0   ;AC0 OPERAND.
22291  123026  000000
22292  123030  137777  177777          2$:     .WORD   137777,177777             ;EXPECTED RESULT.
22293  123034  140000  177777          3$:     .WORD   140000,177777             ;ANTICIPATED ERRONEOUS RESULT.
22294  123040  040707                  4$:     40707                     ;FPS BEFORE EXECUTION.
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22295  123042  040710                          40710                   ;FPS AFTER EXECUTION.
22296  123044  177777                          -1                      ;ANTICIPATED ERRONEOUS FPS.
22297  123046  177777                          -1              ;EXPECTED FEC.
22298                                  ;EXP=41 (OCT),  AC NEG, FL=1, FIC=1
22299  123050  004737  123266          WWC15:  JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22300  123054  150200  000000  000000  1$:     .WORD   150200,0,0,0    ;AC0 OPERAND.
22301  123062  000000
22302  123064  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
22303  123070  177777  177777          3$:     .WORD   -1,-1           ;ANTICIPATED ERRONEOUS RESULT.
22304  123074  040700                  4$:     40700                   ;FPS BEFORE EXECUTION.
22305  123076  140705                          140705                  ;FPS AFTER EXECUTION.
22306  123100  177777                          -1                      ;ANTICIPATED ERRONEOUS FPS.
22307  123102  000006                          6               ;EXPECTED FEC.
22308                                  ;EXP=40 (OCT),  AC NEG,  FL=1,  FIC=1
22309  123104  004737  123266          WWC16:  JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22310  123110  150000  000001  000000  1$:     .WORD   150000,1,0,0    ;AC0 OPERAND.
22311  123116  000000
22312  123120  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
22313  123124  100000  177600          3$:     .WORD   100000,-200             ;ANTICIPATED ERRONEOUS RESULT.
22314  123130  040700                  4$:     40700                   ;FPS BEFORE EXECUTION.
22315  123132  140705                          140705                  ;FPS AFTER EXECUTION.
22316  123134  040700                          40700                   ;ANTICIPATED ERRONEOUS FPS.
22317  123136  000006                          6               ;EXPECTED FEC.
22318                                  ;EXP=40, AC NEGATIVE, FL=1, FIC=1
22319  123140  004737  123266          WWC17:  JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22320  123144  150001  000000  000000  1$:     .WORD   150001,0,0,0    ;AC0 OPERAND.
22321  123152  000000
22322  123154  000000  000000          2$:     .WORD   0,0             ;EXPECTED RESULT.
22323  123160  077400  000000          3$:     .WORD   77400,0         ;ANTICIPATED ERRONEOUS RESULT.
22324  123164  040700                  4$:     40700                   ;FPS BEFORE EXECUTION.
22325  123166  140705                          140705                  ;FPS AFTER EXECUTION.
22326  123170  177777                          -1                      ;ANTICIPATED ERRONEOUS FPS.
22327  123172  000006                          6               ;EXPECTED FEC.
22328                                  ;EXP 40    (OCT), AC MOST NEG LONG INT, FL=1
22329                                  ;FIC=1
22330  123174  004737  123266          WWC20:  JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22331  123200  150000  000000  000000  1$:     .WORD   150000,0,0,0    ;AC0 OPERAND.
22332  123206  000000
22333  123210  100000  000000          2$:     .WORD   100000,0                ;EXPECTED RESULT.
22334  123214  000000  000000          3$:     .WORD   0,0             ;ANTICIPATED ERRONEOUS RESULT.
22335  123220  040700                  4$:     40700                           ;FPS BEFORE EXECUTION.
22336  123222  040710                          40710                   ;FPS AFTER EXECUTION.
22337  123224  140705                          140705                  ;ANTICIPATED ERRONEOUS FPS.
22338  123226  177777                          -1              ;EXPECTED FEC.
22339                                  ;EXP=20, AC = MOST NEG INTEGER, FL=0, FIC=1
22340
22341  123230  004737  123266          WWC21:  JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22342  123234  144000  000001  000000  1$:     .WORD   144000,1,0,0,   ;AC0 OPERAND.
22343  123242  000000
22344  123244  100000  177777          2$:     .WORD   100000,-1               ;EXPECTED RESULT.
22345  123250  100000  177400          3$:     .WORD   100000,177400           ;ANTICIPATED ERRONEOUS RESULT.
22346  123254  040600                  4$:     40600                   ;FPS BEFORE EXECUTION.
22347  123256  040610                          40610                   ;FPS AFTER EXECUTION.
22348  123260  140605                          140605                  ;ANTICIPATED ERRONEOUS FPS.
22349  123262  177777                          -1              ;EXPECTED FEC.
22350  123264  000457                  6$:     BR      WWCDONE
```

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22351
22352                   ;THIS SUBROUTINE, STCSUB, IS USED TO SET UP THE OPERANDS, EXECUTE
22353                   ;THE STCDI OR STCDL INSTRUCTION AND CHECK THE RESULTS. A CALL
22354                   ;TO IT IS MADE THUS:
22355                   ;
22356                   ;               JSR     PC,@#STCSUB
22357                   ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
22358                   ;               RES:    .WORD   X,X             ;EXPECTED RESULT
22359                   ;               ERRES:  .WORD   X,X             ;ERROR RESULT
22360                   ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
22361                   ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
22362                   ;               ERFPS:  .WORD   X               ;ERROR FPS.
22363                   ;               FEC:    .WORD   X               ;EXPECTED FEC
22364                   ;               ERR1:   ERROR   X               ;DATA ERROR.
22365                   ;                       BR      CONT
22366                   ;               ERR2:   ERROR   X               ;FPS ERROR.
22367                   ;               CONT:                           ;RETURN ADDRESS
22368                   ;
22369                   ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
22370                   ;THE STCDI OR STCDL INSTRUCTION IS EXECUTED.
22371                   ;THE RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
22372                   ;COMPARED WITH FPSA IF THIS TOO IS CORRECT STCSUB RETURNS CONTROL
22373                   ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD STCSUB
22374                   ;COMPARE IT TO ERROR FPS. IF THIS MATCHES THEN STCSUB WILL RETURN
22375                   ;TO THE ERROR CALL AT ERR2, OTHERWISE STCSUB ITSELF
22376                   ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
22377                   ;STCDI OR STCDL IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
22378                   ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
22379                   ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN STCSUB
22380                   ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR1. OTHERWISE THE
22381                   ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND STCSUB WILL
22382                   ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
22383
22384  123266  012601               STCSUB: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
22385  123270  012700  000200               MOV     #200,R0         ;SET UP THE AC0 OPERAND.
22386  123274  170100                       LDFPS   R0
22387  123276  010100                       MOV     R1,R0
22388  123300  172410                       LDD     (R0),AC0
22389  123302  012702  123414               MOV     #STCIBF,R2      ;INITIALIZE THE OUT PUT BUFFER.
22390  123306  012700  000004               MOV     #4,R0
22391  123312  012722  177777       1$:     MOV     #-1,(R2)+
22392  123316  077003                       SOB     R0,1$
22393  123320  016100  000020               MOV     20(R1),R0       ;SET THE FPS.
22394  123324  170100                       LDFPS   R0
22395  123326  012700  123414               MOV     #STCIBF,R0
22396  123332  175410               2$:     STCDL   AC0,(R0)        ;TEST INSTRUCTION.
22397
22398  123334  170204                       STFPS   R4              ;GET THE FPS.
22399  123336  170305                       STST    R5              ;GET THE FEC.
22400  123340  010102                       MOV     R1,R2
22401  123342  062702  000010               ADD     #10,R2
22402  123346  012700  123414               MOV     #STCIBF,R0      ;SEE IF THE RESULT IS CORRECT.
22403  123352  012703  000002               MOV     #2,R3
22404  123356  022022               3$:     CMP     (R0)+,(R2)+
22405  123360  001014                       BNE     10$
22406  123362  077303                       SOB     R3,3$
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22407  123364  016102  000022          MOV     22(R1),R2
22408  123370  020204                  CMP     R2,R4           ;SEE IF THE FPS IS CORRECT.
22409  123372  001007                  BNE     10$             ;BRANCH IF INCORRECT.
22410  123374  005702                  TST     R2
22411  123376  100003                  BPL     4$
22412  123400  026105  000026          CMP     26(R1),R5       ;SEE IF THE FEC IS CORRECT.
22413  123404  001002                  BNE     10$             ;BRANCH IF INCORRECT.
22414
22415  123406  000161  000030  4$:     JMP     30(R1)          ;RETURN.
22416  123412                  10$:
22417  123412  104000                  EMT                     ;
22418
22419                          ;DATA BUFFER:
22420  123414  177777  177777  177777 STCIBF: .WORD   -1,-1,-1,-1
22421  123422  177777
22422
22423  123424                 WWCDONE:
22424  123424  004767  001142          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
22425                                                          ;SEE IF THE USER HAS EXPRESSED
22426                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
22427                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
22428                                                          ;THE USER TYPED CONTROL G?).
22429
22430
22431                          ;*****************************************************************************
22432                          ;TEST 604       STCFL AND STCFI TEST
22433                          ;*****************************************************************************
22434  123430                 TS604:
22435
22436
22437                          ;EXPONENT=37, FL=1
22438  123430  004737  123266          JSR     PC,@#STCSUB     ;GO EXECUTE THE INSTRUCTION.
22439  123434  047777  177777  177777 1$:     .WORD   47777,-1,-1,-1  ;AC0 OPERAND.
22440  123442  177777
22441  123444  077777  177600         2$:     .WORD   77777,177600            ;EXPECTED RESULT.
22442  123450  077777  177777         3$:     .WORD   77777,177777            ;ANTICIPATED ERRONEOUS RESULT.
22443  123454  040100                 4$:     40100                   ;FPS BEFORE EXECUTION.
22444  123456  040100                         40100                   ;FPS AFTER EXECUTION.
22445  123460  177777                         -1                      ;ANTICIPATED ERRONEOUS FPS.
22446  123462  177777                         -1              ;EXPECTED FEC.
22447  123464                 XXCDONE:
22448  123464  004767  001102          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
22449                                                          ;SEE IF THE USER HAS EXPRESSED
22450                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
22451                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
22452                                                          ;THE USER TYPED CONTROL G?).
22453
22454
22455                          ;*****************************************************************************
22456                          ;TEST 605       STEXP TEST
22457                          ;*****************************************************************************
22458  123470                 TS605:
22459
22460                          ; EXP = 100 (EXCESS 200)
22461  123470  004737  123676 YYC1:   JSR     PC,@#STXSUB
22462  123474  020000  000000  000000 1$:     .WORD   20000,0,0,0                     ;AC
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22463  123502  000000
22464  123504  177700                  2$:     -100                                    ;EXP RES
22465  123506  052525                  3$:     52525                                   ;ERROR EXP.
22466  123510  040000                  4$:     40000                                   ;FPSB
22467  123512  040010                          40010                                   ;FPSA
22468  123514  040000                          40000                                   ;ERROR FPS
22469                                  ; EXP = 200 (EXCESS 200)
22470  123516  004737  123676          YYC2:   JSR     PC,@#STXSUB     ;GO EXECUTE THE INSTRUCTION.
22471  123522  040000  000000  000000  1$:     .WORD   40000,0,0,0     ;AC0 OPERAND.
22472  123530  000000
22473  123532  000000                  2$:     0                               ;EXPECTED EXPONENT RESULT.
22474  123534  052525                  3$:     52525           ;ANTICIPATED ERRONEOUS RESULT.
22475  123536  040000                  4$:     40000                   ;FPS BEFORE EXECUTION.
22476  123540  040004                          40004                   ;FPS AFTER EXECUTION.
22477  123542  040000                          40000                   ;ANTICIPATED ERRONEOUS FPS.
22478                                  ; EXP = 201 (EXCESS 200)
22479  123544  004737  123676          YYC3:   JSR     PC,@#STXSUB     ;GO EXECUTE THE INSTRUCTION.
22480  123550  040200  000000  000000  1$:     .WORD   40200,0,0,0     ;AC0 OPERAND.
22481  123556  000000
22482  123560  000001                  2$:     1                               ;EXPECTED EXPONENT RESULT.
22483  123562  052525                  3$:     52525           ;ANTICIPATED ERRONEOUS RESULT.
22484  123564  040000                  4$:     40000                   ;FPS BEFORE EXECUTION.
22485  123566  040000                          40000                   ;FPS AFTER EXECUTION.
22486  123570  040004                          40004                   ;ANTICIPATED ERRONEOUS FPS.
22487                                  ; EXP = 375  (EXCESS 200)
22486
22489  123572  004737  123676          YYC4:   JSR     PC,@#STXSUB     ;GO EXECUTE THE INSTRUCTION.
22490  123576  077200  000000  000000  1$:     .WORD   77200,0,0,0     ;AC0 OPERAND.
22491  123604  000000
22492  123606  000175                  2$:     175                             ;EXPECTED EXPONENT RESULT.
22493  123610  052525                  3$:     52525           ;ANTICIPATED ERRONEOUS RESULT.
22494  123612  040000                  4$:     40000                   ;FPS BEFORE EXECUTION.
22495  123614  040000                          40000                   ;FPS AFTER EXECUTION.
22496  123616  040010                          40010                   ;ANTICIPATED ERRONEOUS FPS.
22497                                  ; EXP = 1  (EXCESS 200)
22498
22499  123620  004737  123676          YYC5:   JSR     PC,@#STXSUB     ;GO EXECUTE THE INSTRUCTION.
22500  123624  000200  000000  000000  1$:     .WORD   200,0,0,0       ;AC0 OPERAND.
22501  123632  000000
22502  123634  177601                  2$:     -177                            ;EXPECTED EXPONENT RESULT.
22503  123636  052525                  3$:     52525           ;ANTICIPATED ERRONEOUS RESULT.
22504  123640  040000                  4$:     40000                   ;FPS BEFORE EXECUTION.
22505  123642  040010                          40010                   ;FPS AFTER EXECUTION.
22506  123644  040000                          40000                   ;ANTICIPATED ERRONEOUS FPS.
22507                                  ; EXP = 156  (EXCESS 200)
22508
22509  123646  004737  123676          YYC6:   JSR     PC,@#STXSUB     ;GO EXECUTE THE INSTRUCTION.
22510  123652  033400  000000  000000  1$:     .WORD   33400,0,0,0     ;AC0 OPERAND.
22511  123660  000000
22512  123662  177756                  2$:     -22                             ;EXPECTED EXPONENT RESULT.
22513  123664  052525                  3$:     52525           ;ANTICIPATED ERRONEOUS RESULT.
22514  123666  047707                  4$:     47707                   ;FPS BEFORE EXECUTION.
22515  123670  047710                          47710                   ;FPS AFTER EXECUTION.
22516  123672  177777                          -1                      ;ANTICIPATED ERRONEOUS FPS.
22517  123674  000452                          BR      YYCDONE
22518
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22519                                   ;THIS SUBROUTINE, STXSUB, IS USED TO SET UP THE OPERANDS, EXECUTE
22520                                   ;THE STEXP INSTRUCTION AND CHECK THE RESULTS. A CALL
22521                                   ;TO IT IS MADE THUS:
22522                                   ;
22523                                   ;               JSR     PC,@#STXSUB
22524                                   ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
22525                                   ;               RES:    .WORD   X               ;EXPECTED RESULT
22526                                   ;               ERRES:  .WORD   X               ;ERROR RESULT
22527                                   ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
22528                                   ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
22529                                   ;               ERFPS:  .WORD   X               ;ERROR FPS.
22530                                   ;               ERR1:   ERROR   X               ;DATA ERROR.
22531                                   ;                       BR      CONT
22532                                   ;               ERR2:   ERROR   X               ;FPS ERROR.
22533                                   ;               CONT:                           ;RETURN ADDRESS
22534                                   ;
22535                                   ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
22536                                   ;THE STEXP INSTRUCTION IS EXECUTED.
22537                                   ;THE RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
22538                                   ;COMPARED WITH FPSA IF THIS TOO IS CORRECT STXSUB RETURNS CONTROL
22539                                   ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD STXSUB
22540                                   ;COMPARE IT TO ERROR FPS. IF THIS MATCHES THEN STXSUB WILL RETURN
22541                                   ;TO THE ERROR CALL AT ERR2, OTHERWISE STXSUB ITSELF
22542                                   ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
22543                                   ;STEXP IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
22544                                   ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
22545                                   ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN STXSUB
22546                                   ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR1. OTHERWISE THE
22547                                   ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND STXSUB WILL
22548                                   ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
22549
22550  123676  012601                   STXSUB: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
22551  123700  010102                           MOV     R1,R2
22552  123702  012737  123456  124010           MOV     #123456,@#STXBF
22553  123710  012737  076543  124012           MOV     #76543,@#STXBF+2
22554  123716  012700  000200                   MOV     #200,R0
22555  123722  170100                           LDFPS   R0
22556  123724  010100                           MOV     R1,R0           ;SET UP THE AC0 OPERAND.
22557  123726  172410                           LDD     (R0),AC0
22558  123730  016100  000016                   MOV     16(R1),R0       ;SET THE FPS.
22559  123734  170100                           LDFPS   R0
22560  123736  012700  124010                   MOV     #STXBF,R0
22561  123742  175010                   1$:     STEXP   AC0,(R0)        ;TEST INSTRUCTION.
22562  123744  170204                           STFPS   R4              ;GET FPS.
22563  123746  026137  000010  124010           CMP     10(R1),@#STXBF  ;WAS RESULT CORRECT?
22564  123754  001401                           BEQ     5$
22565  123756  104000                           EMT                     ;
22566  123760  020461  000016           5$:     CMP     R4,16(R1)       ;SEE IF THE FPS IS CORRECT.
22567  123764  001401                           BEQ     10$
22568  123766  104000                           EMT                     ;
22569                                   ;SEE IF MORE THAN ONE WORD WAS WRITTEN IN THE OUTPUT BUFFER.
22570  123770  022737  076543  124012   10$:    CMP     #76543,@#STXBF+2
22571  123776  001401                           BEQ     4$
22572  124000  104000                           EMT                     ;
22573  124002  000161  000022           4$:     JMP     22(R1)
22574
```

```
                                        -1
124006  177777
124010  177777  177777  177777  STXBF:  .WORD   -1,-1,-1,-1,-1
124016  177777  177777
                                YYCDONE:
124022
124022  004767  000544                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                ;THE USER TYPED CONTROL G?).
                                ;*****************************************************************************
                                ;TEST 606       STST TEST
                                ;*****************************************************************************
124026                          TS606:
124026  012700  040000                  MOV     #40000,R0       ;SET FPS. FID=1.
124032  170100                          LDFPS   R0
124034  170003                  ZZC2:   .WORD   170003                  ;ILLEGAL FPP
                                                                        ;OP CODE
124036  012700  124116                  MOV     #ZZCBF,R0       ;SET UP THE OUTPUT BUFFER.
124042  012710  177777                  MOV     #-1,(R0)
124046  012760  177777  000002          MOV     #-1,2(R0)
124054  170310                  ZZC3:   STST    (R0)                    ;GET FEC AND
                                                                        ;FEA
124056  170204                          STFPS   R4              ;GET FPS.
124060  012700  124116                  MOV     #ZZCBF,R0
124064  022710  000002                  CMP     #2,(R0) ;SEE IF FEC IS CORRECT.
124070  001010                          BNE     ZZC10           ;BRANCH IF INCORRECT.
124072  022760  124034  000002          CMP     #ZZC2,2(R0)     ;SEE IF FEA, ADDRESS, IS CORRECT.
124100  001004                          BNE     ZZC10           ;BRANCH IF INCORRECT.
124102  022704  140000                  CMP     #140000,R4      ;SEE IF FPS IS CORRECT.
124106  001001                          BNE     ZZC10           ;BRANCH IF INCORRECT.
124110  000407                          BR      ZZCDONE
124112                          ZZC10:
124112  104000                          EMT                     ;
                                ;DATA BUFFER:
                                        -1
124114  177777
124116  177777  177777  177777  ZZCBF:  .WORD   -1,-1,-1,-1
124124  177777
124126  177777                          -1
                                ZZCDONE:
124130
124130  004767  000436                  JSR     PC,..RSET       ;GO INITIALIZE THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                ;THE USER TYPED CONTROL G?).
                                ;*****************************************************************************
                                ;TEST 607       SPECIAL CASE TEST
                                ;*****************************************************************************
124134                          TS607:
```

```
22631  124134  012746  144724          AAD1:   MOV     #144724, -(SP)  ;PUT FRACTION ON STACK
22632  124140  012746  040600                  MOV     #40600, -(SP)   ;PUT EXPONENT ON STACK
22633  124144  005046                          CLR     -(SP)           ;PUT SUBTRAHEND FRACTION ON STACK
22634  124146  012746  040600                  MOV     #40600, -(SP)   ;PUT SUBTRAHEND EXPONENT ON STACK
22635  124152  172466  000004                  LDF     4(SP), AC0      ;LOAD FP ACCUMULATORS
22636  124156  173026                          SUBF    (SP)+, AC0      ;DO SUBTRACTION
22637  124160  174037  124210                  STF     AC0, @#AADBF    ;GET AND STORE ANSWER
22638  124164  022737  036711  124210          CMP     #36711, @#AADBF ;IS EXPONENT CORRECT
22639  124172  001401                          BEQ     1$
22640  124174  104000                          EMT                     ;BAD EXPONENT FROM SUBTRACTION
22641  124176  022737  152000  124212  1$:     CMP     #152000, @#AADBF+2 ;IS FRACTION CORRECT
22642  124204  001403                          BEQ     AADDONE
22643  124206  104000                          EMT                     ;FRACTION INCORRECT
22644
22645  124210  000000          AADBF:  .WORD   0
22646  124212  000000                  .WORD   0
22647
22648  124214  012706  001000  AADDONE: MOV     #STBOT, SP      ;RESTORE STACK POINTER
22649  124220  004767  000346          JSR     PC,.RSET        ;GO INITIALIZE THE FPS AND STACK; AND
22650                                                          ;SEE IF THE USER HAS EXPRESSED
22651                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
22652                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
22653                                                          ;THE USER TYPED CONTROL G?).
22654
22655
22656
22657                  ;*****************************************************************************
22658                  ;TEST 610       INTERRUPTABILITY TEST
22659                  ;*****************************************************************************
22660  124224          TS610:
22661  124224  004567  124160  BBD1:   JSR     R5,CHKAPT
22662  124230  000520                  BR      FPEXIT          ;SKIP TEST IF ON APT AND NOT FIRST PASS
22663
22664  124232  005001                  CLR     R1              ;INITIALIZE A COUPLE OF COUNTERS
22665  124234  005000                  CLR     R0
22666  124236  013767  000064  113114          MOV     @#64,   $TMP0   ;SAVE INTERRUPT VECTOR
22667  124244  013767  000066  113110          MOV     @#66,   $TMP1   ;SAVE INTERRUPT PRIORITY
22668  124252  012737  124324  000064          MOV     #3$,    @#64    ;SET UP INTERRUPT PRIORITY FOR THIS TEST
22669  124260  005037  000066                  CLR     @#66            ;AND PRIORITY
22670  124264  005067  053506                  CLR     PS              ;PUT PROCESSOR PRIORITY AT 0
22671  124270  005067  053272                  CLR     TPB             ;SEND A NULL CHARACTER
22672  124274  105767  053264          1$:     TSTB    TTCSR           ;WAIT FOR DONE TO SET
22673  124300  100375                  BPL     1$
22674  124302  005067  053260                  CLR     TPB             ;SEND A SECOND CHARACTER
22675  124306  052767  000100  053250          BIS     #BIT6,  TTCSR   ;SET INTERRUPT ENABLE
22676  124314  005200          2$:     INC     R0              ;INCREMENT COUNTER TO GET BASE TIME
22677  124316  001376                  BNE     2$              ;CONTINUE LOOPING UNLESS COUNTER GOES TO 0
22678  124320  000005                  RESET                   ;IF NO INTERRUPT YET KILL IT
22679  124322  104000                  EMT                     ;NO INTERRUPT OCCURRED IN ALLOTTED TIME
22680  124324  166700  000110  3$:     SUB     Y,      R0      ;SUBTRACT TIME FOR FP INSTRUCTION
22681  124330  010067  000106          MOV     R0,     Z       ;SAVE FIRST TIME
22682  124334  012737  124412  000064          MOV     #7$,    @#64    ;SET UP FOR NEXT INTERRUPT
22683  124342  005100          4$:     COM     R0              ;MAKE PRE LOOP COUNTER NEGATIVE
22684  124344  005067  053214                  CLR     TTCSR           ;MAKE SURE NO INTERRUPT YET
22685  124350  005067  053212                  CLR     TPB             ;SEND A CHARACTER
22686  124354  105767  053204          5$:     TSTB    TTCSR           ;WAIT FOR READY BIT TO SET
```

```
22687  124360  100375                          BPL     5$
22688  124362  005067  053200                  CLR     TPB                     ;SEND SECOND CHARACTER
22689  124366  052767  000100  053170          BIS     #BIT6,  TTCSR           ;SET INTERRUPT ENABLE
22690  124374  005200                  6$:     INC     R0                      ;DO PRE LOOP
22691  124376  001376                          BNE     6$
22692  124400  171227  040400                  MULF    #2,     AC2             ;DO FLOATING POINT INSTRUCTION
22693  124404  000240                          NOP                             ;JUST IN CASE INTERRUPT TAKES TOO LONG
22694  124406  000005                          RESET                           ;IF NO INTERRUPT CLEAR THE WORLD
22695  124410  104000                          EMT                             ;INTERRUPT NOT BACK IN ALLOTTED TIME
22696  124412  005201                  7$:     INC     R1                      ;INCREMENT TIMES THROUGH COUNTER
22697  124414  020127  000015                  CMP     R1,     #15             ;HAVE WE PASSED HERE 15 TIMES BEFORE
22698  124420  001411                          BEQ     BBDDONE                 ;IF YES I MAY NEVER PASS HERE AGAIN
22699  124422  062767  000002  000012          ADD     #2,     Z               ;IF NO ADD A LITTLE TIME TO PRELOOP
22700  124430  016700  000006                  MOV     Z,      R0              ;PUT NEW COUNT IN COUNTER
22701  124434  000742                          BR      4$                      ;DO IT ALL AGAIN
22702
22703  124436  000000                  X:      .WORD   0
22704  124440  000026                  Y:      .WORD   26
22705  124442  000000                  Z:      .WORD   0
22706
22707  124444  042767  000100  053112  BBDDONE:BIC     #100,   TTCSR           ;CLEAR INTERRUPT ENABLE BEFORE EXITING TEST
22708  124452  016737  112702  000064          MOV     $TMP0,  @#64            ;RESTORE PRINTER VECTOR
22709  124460  016737  112676  000066          MOV     $TMP1,  @#66            ;RESTORE PRINTER PRIORITY
22710  124466  004767  000100                  JSR     PC,.RSET                ;GO INITIALIZE THE FPS AND STACK; AND
22711                                                                          ;SEE IF THE USER HAS EXPRESSED
22712                                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
22713                                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
22714                                                                          ;THE USER TYPED CONTROL G?).
22715  124472  000167  000160          FPEXIT: JMP     SLU1ST                  ;GET OVER SUBROUTINES TO NEXT TEST
22716
22717
22718  124476  012737  000003  001002  ERROR4: MOV     #3,@#$FATAL                     ;SET UP FATAL ERROR NUMBER
22719  124504  012767  000001  054266          MOV     #1,$MSGTY                       ;SET FATAL ERROR FLAG
22720  124512  032737  000001  001020          BIT     #1,@#$ENV                       ;UNDER APT
22721  124520  001004                          BNE     FPHLT                           ;YES
22722  124522  012700  124534                  MOV     #FPMSG,R0
22723  124526  004767  006576                  JSR     PC,TYPE
22724  124532  000777                  FPHLT:  BR      .                       ;STAY HERE FOREVER
22725
22726  124534  040506  046111  042105  FPMSG:  .ASCIZ  /FAILED DURING THE FPP TESTS/<12><15>
22727  124542  042040  051125  047111
22728  124550  020107  044124  020105
22729  124556  050106  020120  042524
22730  124564  052123  005123  000015
22731                                  .EVEN
22732
22733                                          .SBTTL  FLAG RESET ROUTINE
22734                                  ;*******************************************************************************
22735                                  ;*THIS ROUTINE WILL BE CALLED AT THE END OF EACH FLOATING POINT TEST
22736                                  ;*TO RESET THE STACK, CLEAR THE FPS AND REINITIALIZE TRAP VECTORS
22737
22738  124572  012737  124476  000244  .RSET:  MOV     #ERROR4,@#FPVECT
22739  124600  012737  021336  000004          MOV     #T04,@#ERRVECT
22740  124606  012737  021340  000010          MOV     #T010,@#10
22741  124614  011600                          MOV     (SP),R0
22742  124616  012706  001000                  MOV     #STBOT,SP
```

```
22743  124622  005004                          CLR     R4
22744  124624  170104                          LDFPS   R4
22745  124626  000110                          JMP     (R0)
22746
22747                                  ;THESE ARE SOME EQUATES USED IN THE  PROGRAM
22748          000001                          BIT0=000001
22749          000002                          BIT1=000002
22750          000004                          BIT2=000004
22751          000010                          BIT3=000010
22752          000020                          BIT4=000020
22753          000040                          BIT5=000040
22754          000100                          BIT6=000100
22755          000200                          BIT7=000200
22756          000400                          BIT8=000400
22757          001000                          BIT9=001000
22758          002000                          BIT10=002000
22759          004000                          BIT11=004000
22760          010000                          BIT12=010000
22761          020000                          BIT13=020000
22762          040000                          BIT14=040000
22763          100000                          BIT15=100000
22764
22765  124630  177560                  RCSR:   177560                  ;ADDRESS OF RECEIVER COMMAND/STATUS REGISTER
22766  124632  177562                  RBUF:   177562                  ;ADDRESS OF RECEIVER BUFFER
22767  124634  177564                  TCSR:   177564                  ;ADDRESS OF TRANSMITTER COMMAND/STATUS REGISTER
22768  124636  177566                  TBUF:   177566                  ;ADDRESS OF TRANSMITTER BUFFER
22769  124640  000060                  RVECT:  60                      ;RECEIVER INTERRUPT VECTOR
22770  124642  000062                  RPSW:   62
22771  124644  000064                  TVECT:  64                      ;TRANSMITTER INTERRUPT VECTOR
22772  124646  000066                  TPSW:   66
22773
22774                                  ;REAL TIME CLOCK REGISTER AND VECTOR ADDRESSES
22775  124650  177546                  LKS:    .WORD   177546
22776  124652  000100                  RTCVT:  .WORD   100
22777  124654  000102                  RTCPSW: .WORD   102
22778
22779  124656  000244                  SLU1ST: CLZ
22780  124660  032777  000004  074516          BIT     #4,@SWR
22781  124666  001402                          BEQ     1$
22782  124670  000167  001106                  JMP     KWSTRT
22783  124674  012737  000004  001004  1$:     MOV     #4,@#$TESTN     ;PUT TEST NUMBER IN MAILBOX
22784  124702  012737  125720  000030          MOV     #ERROR5,@#30    ;SET UP FOR CORRECT ERROR CALL
22785
22786
22787                                  ;*****************************************************************************
22788                                  ;TEST 611       TEST ABILITY TO REFERENCE TCSR
22789                                  ;*****************************************************************************
22790  124710                          TS611:
22791  124710  013703  000004                  MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
22792  124714  012737  124730  000004          MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
22793  124722  005777  177706                  TST     @TCSR           ;REFERENCE THE XMIT COMMAND/STATUS REG.
22794  124726  000401                          BR      4$
22795  124730                          1$:
22796  124730  104000                          EMT                     ;
22797  124732  010337  000004          4$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
22798
```

```
22799
22800
22801                                   ;*****************************************************************************
22802                                   ;TEST 612       TEST ABILITY TO REFERENCE TBUF
22803                                   ;*****************************************************************************
22804  124736                           TS612:
22805  124736  013703  000004                   MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
22806  124742  012737  124756  000004           MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
22807  124750  005777  177662                   TST     @TBUF           ;REFERENCE THE XMIT BUFFER
22808  124754  000401                           BR      4$
22809  124756                           1$:
22810  124756  104000                           EMT                     ;
22811  124760  010337  000004           4$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
22812
22813
22814                                   ;*****************************************************************************
22815                                   ;TEST 613       TEST THAT TCSR BIT7(DONE) CLEARS WHEN XBUF IS LOADED
22816                                   ;*****************************************************************************
22817  124764                           TS613:
22818  124764  032737  000001  001020           BIT     #1,@#$ENV       ;ARE WE RUNNING UNDER APT
22819  124772  001405                           BEQ     70$             ;IF NO THEN SERIES OF TESTS
22820  124774  005737  001006                   TST     @#$PASS         ;IS THIS FIRST PASS
22821  125000  001402                           BEQ     70$             ;IF YES THEN DO SERIES OF TESTS
22822  125002  000167  000774                   JMP     KWSTRT          ;IF NO THEN BYPASS SERIES OF TESTS
22823  125006  005077  177624           70$:    CLR     @TBUF           ;LOAD XBUF
22824  125012  105777  177616                   TSTB    @TCSR           ;CHECK DONE
22825  125016  100006                           BPL     3$              ;BR IF CLEAR
22826                                                                   ;FILL SECOND BUFFER BECUASE REFRESH COULD CAUSE
22827                                                                   ;FIRST TEST TO FAIL
22828  125020  005077  177612                   CLR     @TBUF           ;FILL DOUBLE BUFFER
22829  125024  105777  177604                   TSTB    @TCSR           ;CHECK DONE
22830  125030  100001                           BPL     3$
22831  125032  104000                           EMT                     ;
22832  125034  005000           3$:     CLR     R0              ;CLEAR TIMER
22833  125036  105777  177572           4$:     TSTB    @TCSR           ;CHECK FOR XMIT DONE
22834  125042  100403                           BMI     5$              ;IF DONE SETS, BR TO END OF TEST
22835  125044  005200                           INC     R0              ;INCREMENT TIMER
22836  125046  001373                           BNE     4$
22837  125050  104000                           EMT                     ;
22838  125052           5$:
22839
22840
22841                                   ;*****************************************************************************
22842                                   ;TEST 614       TEST THAT TCSR "DONE" SETS WITH RESET
22843                                   ;*****************************************************************************
22844  125052                           TS614:
22845  125052  005077  177560                   CLR     @TBUF           ;LOAD TRANSMIT BUFFER
22846  125056  105777  177552           1$:     TSTB    @TCSR           ;WAIT FOR DONE
22847  125062  100375                           BPL     1$
22848  125064  005077  177546                   CLR     @TBUF           ;LOAD SECOND BUFFER
22849  125070  000240                           NOP
22850  125072  000005                           RESET                   ;SET DONE WITH RESET
22851  125074  105777  177534                   TSTB    @TCSR           ;CHECK FOR DONE SET
22852  125100  100401                           BMI     TS615
22853  125102  104000                           EMT                     ;
22854
```

```
22855
22856
22857                                   ;*****************************************************************************
22858                                   ;TEST 615       TEST ABILITY TO ACCESS RCSR
22859                                   ;*****************************************************************************
22860   125104                          TS615:
22861   125104  013703  000004                 MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
22862   125110  012737  125124  000004        MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
22863   125116  005777  177506                TST     @RCSR           ;ACCESS RCSR
22864   125122  000401                        BR      2$
22865   125124                          1$:
22866   125124  104000                        EMT                     ;
22867   125126  010337  000004          2$:   MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
22868
22869
22870                                   ;*****************************************************************************
22871                                   ;TEST 616       TEST ABILITY TO ACCESS RBUF
22872                                   ;*****************************************************************************
22873   125132                          TS616:
22874   125132  013703  000004                 MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
22875   125136  012737  125152  000004        MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
22876   125144  005777  177462                TST     @RBUF           ;ACCESS RBUF
22877   125150  000401                        BR      2$
22878   125152                          1$:
22879   125152  104000                        EMT                     ;
22880   125154  010337  000004          2$:   MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
22881
22882
22883
22884
22885                                   ;*****************************************************************************
22886                                   ;TEST 617       TEST THAT BIT6 OF RCSR CAN BE SET & RESET
22887                                   ;*****************************************************************************
22888   125160                          TS617:
22889   125160  017703  177454                 MOV     @RVECT,R3       ;SAVE RECEIVE VECTOR
22890   125164  012777  125206  177446        MOV     #1$,@RVECT      ;SET UP INTERRUPT VECTOR FOR ERROR REPORT
22891   125172  106427  000340                MTPS    #340            ;SET PSW TO PRIORITY 7
22892   125176  032777  000100  177424        BIT     #BIT6,@RCSR     ;TEST BIT6 OF RCSR
22893   125204  001401                        BEQ     2$
22894   125206                          1$:
22895   125206  104000                        EMT                     ;
22896   125210  052777  000100  177412  2$:   BIS     #BIT6,@RCSR     ;SET BIT6 OF RCSR
22897   125216  032777  000100  177404        BIT     #BIT6,@RCSR     ;TEST BIT6 OF RCSR
22898   125224  001001                        BNE     3$
22899   125226  104000                        EMT                     ;
22900   125230  042777  000100  177372  3$:   BIC     #BIT6,@RCSR     ;CLEAR BIT6 OF RCSR
22901   125236  032777  000100  177364        BIT     #BIT6,@RCSR     ;TEST BIT6 OF RCSR
22902   125244  001401                        BEQ     4$
22903   125246  104000                        EMT                     ;
22904   125250                          4$:
22905   125250  052777  000100  177352        BIS     #BIT6,@RCSR     ;SET BIT6 OF RCSR
22906   125256  000005                        RESET                   ;CLEAR BIT6OF RCSR WITH RESET
22907   125260  032777  000100  177342        BIT     #BIT6,@RCSR     ;TEST BIT6 OF RCSR
22908   125266  001401                        BEQ     5$
22909   125270  104000                        EMT                     ;
22910   125272  010377  177342          5$:   MOV     R3,@RVECT       ;RESTORE RECEIVE VECTOR
```

```
22911
22912
22913
22914                                   ;*****************************************************************************
22915                                   ;TEST 620       TEST THAT XMIT INTERRUPTS ONLY WHEN ENABLED
22916                                   ;*****************************************************************************
22917  125276                           TS620:
22918  125276  042777  000100  177330          BIC     #BIT6,@TCSR     ;CLEAR TRANSMIT INTERRUPT ENABLE
22919  125304  017703  177334                MOV     @TVECT,R3       ;SAVE XMIT VECTOR
22920  125310  012777  125332  177326        MOV     #2$,@TVECT      ;POINT XMIT VECTOR TO ERROR REPORT
22921  125316  105777  177312          1$:   TSTB    @TCSR           ;WAIT FOR DONE
22922  125322  100375                       BPL     1$
22923  125324  106427  000140              MTPS    #140            ;SET PSW TO PRIORITY 3
22924  125330  000401                       BR      3$
22925  125332                           2$:
22926  125332  104000                       EMT                     ;
22927  125334  012777  125354  177302  3$:   MOV     #4$,@TVECT      ;SET XMIT VECTOR TO END OF TEST
22928  125342  052777  000100  177264        BIS     #BIT6,@TCSR     ;ENABLE INTERRUPTS
22929  125350  000240                       NOP
22930
22931  125352  104000                       EMT                     ;XMIT DID NOT INTERRUPT
22932
22933  125354  042777  000100  177252  4$:   BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
22934  125362  022626                       CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
22935  125364  010377  177254                MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
22936
22937
22938                                   ;*****************************************************************************
22939                                   ;TEST 621       TEST THAT XMIT INTERRUPTS DO NOT OCCUR WHEN DISABLED
22940                                   ;*****************************************************************************
22941  125370                           TS621:
22942  125370  042777  000100  177236          BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
22943  125376  106427  000340                MTPS    #340            ;SET PSW TO PRIORITY 7
22944  125402  017703  177236                MOV     @TVECT,R3       ;SAVE XMIT VECTOR
22945  125406  012777  125434  177230        MOV     #2$,@TVECT      ;POINT XMIT VECTOR TO ERROR REPORT
22946  125414  105777  177214          1$:   TSTB    @TCSR           ;WAIT FOR DONE
22947  125420  100375                       BPL     1$
22948  125422  052777  000100  177204        BIS     #BIT6,@TCSR     ;ENABLE INTERRUPT
22949  125430  000240                       NOP
22950  125432  000401                       BR      3$
22951  125434                           2$:
22952  125434  104000                       EMT                     ;
22953  125436  042777  000100  177170  3$:   BIC     #BIT6,@TCSR     ;CLEAR INTERRUPT ENABLE
22954  125444  012777  125462  177172        MOV     #4$,@TVECT      ;POINT XMIT VECTOR TO ERROR REPORT
22955  125452  106427  000140                MTPS    #140            ;SET PSW TO PRIORITY 3
22956  125456  000240                       NOP
22957  125460  000401                       BR      5$
22958  125462                           4$:
22959  125462  104000                       EMT                     ;
22960  125464  010377  177154          5$:   MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
22961
22962
22963                                   ;*****************************************************************************
22964                                   ;TEST 622       TEST TRANSMITTER FOR DOUBLE INTERRUPTS
22965                                   ;*****************************************************************************
22966  125470                           TS622:
```

```
22967  125470  042777  000100  177136          BIC     #BIT6,@TCSR     ;CLEAR INTERRUPT ENABLE
22968  125476  017703  177142                  MOV     @TVECT,R3       ;SAVE XMIT VECTOR
22969  125502  017704  177140                  MOV     @TPSW,R4        ;SAVE XMIT PSW VECTOR
22970  125506  012777  125546  177130          MOV     #2$,@TVECT      ;SET UP XMIT VECTOR
22971  125514  012777  000340  177124          MOV     #340,@TPSW      ;SET PIO 7 AFTER INTERRUPT
22972  125522  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
22973  125526  105777  177102          1$:     TSTB    @TCSR           ;WAIT FOR DONE
22974  125532  100375                          BPL     1$
22975  125534  052777  000100  177072          BIS     #BIT6,@TCSR     ;ENABLE INTERRUPTS
22976  125542  000240                          NOP
22977
22978  125544  104000                          EMT                     ;
22979                                                                  ;XMIT INTERRUPT DID NOT OCCUR
22980  125546  022626                  2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
22981  125550  012777  125574  177066          MOV     #4$,@TVECT      ;POINT XMIT VECTOR TO ERROR
22982  125556  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
22983  125562  000240                          NOP                     ;GIVE TIME FOR ANY INTERRUPTS
22984  125564  042777  000100  177042          BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
22985  125572  000401                          BR      5$
22986  125574                          4$:
22987  125574  104000                          EMT                     ;
22988  125576  010377  177042          5$:     MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
22989  125602  010477  177040                  MOV     R4,@TPSW        ;RESTORE XMIT PSW VECTOR
22990
22991                                  ;*******************************************************************************
22992                                  ;TEST 623       TEST THAT XMIT INTERRUPT CLEARS WITH LOADING TBUF
22993                                  ;*******************************************************************************
22994  125606                          TS623:
22995  125606  042777  000100  177020          BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
22996  125614  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
22997  125620  017703  177020                  MOV     @TVECT,R3       ;SAVE XMIT VECTOR
22998  125624  012777  125674  177012          MOV     #2$,@TVECT      ;POINT XMIT VECTOR TO ERROR
22999  125632  052777  000100  176774          BIS     #BIT6,@TCSR     ;ENABLE INTERRUPTS
23000  125640  005077  176772                  CLR     @TBUF           ;LOAD TBUF
23001  125644  105777  176764          1$:     TSTB    @TCSR           ;WAIT FOR DONE (INTERRUPT)
23002  125650  100375                          BPL     1$
23003  125652  005077  176760                  CLR     @TBUF           ;FILL SECOND BUFFER TO RESET INT.
23004  125656  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23005  125662  000240                          NOP                     ;GIVE TIME FOR ANY INTERRUPTS
23006  125664  042777  000100  176742          BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
23007  125672  000401                          BR      3$
23008  125674                          2$:
23009  125674  104000                          EMT                     ;
23010  125676  010377  176742          3$:     MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
23011  125702  005000                          CLR     R0              ;INITIALIZE LOOP COUNTER
23012  125704  005200                  4$:     INC     R0              ;INCREMENT LOOP COUNTER
23013  125706  001376                          BNE     4$              ; UNTIL COUNTER = 0
23014  125710  005777  176716                  TST     @RBUF           ;CLEAR RECEIVER BUFFER
23015  125714  000167  000062                  JMP     KWSTRT          ;GET TO NEXT TEST
23016
23017  125720  012737  000004  001002  ERROR5: MOV     #4,@#$FATAL     ;SET UP FATAL ERROR NUMBER
23018  125726  012767  000001  053044          MOV     #1,$MSGTY       ;SET FATAL ERROR FLAG
23019  125734  032737  000001  001020          BIT     #1,@#$ENV                       ;UNDER APR ?
23020  125742  001004                          BNE     SL1HLT
23021  125744  012700  125756                  MOV     #SL1MSG,R0
23022  125750  004767  005354                  JSR     PC,TYPE
```

```
23023  125754  000777                    SL1HLT: BR      .
23024
23025  125756  040506  046111  042105    SL1MSG: .ASCIZ  /FAILED SLU1 TEST/<12><15>
23026  125764  051440  052514  020061
23027  125772  042524  052123  006412
23028  126000     000
23029          126002                    .EVEN
23030
23031
23032  126002  000244                    KWSTRT: CLZ
23033  126004  032777  000010  073372            BIT     #10,@SWR
23034  126012  001402                            BEQ     1$
23035  126014  000167  000730                    JMP     SLU2ST
23036  126020  012737  000005  001004    1$:     MOV     #5,@#$TESTN     ;PUT TEST NUMBER IN MAILBOX
23037  126026  012737  126640  000030            MOV     #ERROR6,@#30    ;SET UP ERROR CALL
23038
23039  126034                            LKSTST:
23040                                    ;*****************************************************************************
23041                                    ;TEST 624       TEST ABILITY TO ACCESS LKS
23042                                    ;*****************************************************************************
23043  126034                            TS624:
23044  126034  013703  000004                    MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
23045  126040  012737  126054  000004            MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
23046  126046  005777  176576                    TST     @LKS            ;ACCESS LKS
23047  126052  000401                            BR      2$
23048  126054                            1$:
23049  126054  104000                            EMT                     ;
23050  126056  010337  000004            2$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
23051
23052                                    ;*****************************************************************************
23053                                    ;TEST 625       TEST THAT BIT6 OF LKS CAN BE SET & RESET
23054                                    ;*****************************************************************************
23055  126062                            TS625:
23056  126062  017703  176564                    MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
23057  126066  012777  126110  176556            MOV     #1$,@RTCVT      ;SET UP INTERRUPT VECTOR FOR ERROR REPORT
23058  126074  106427  000340                    MTPS    #340            ;SET PSW TO PRIORITY 7
23059  126100  032777  000100  176542            BIT     #BIT6,@LKS      ;TEST BIT6 OF LKS
23060  126106  001401                            BEQ     2$
23061  126110                            1$:
23062  126110  104000                            EMT                     ;
23063  126112  052777  000100  176530  2$:       BIS     #BIT6,@LKS      ;SET BIT6 OF LKS
23064  126120  032777  000100  176522            BIT     #BIT6,@LKS      ;TEST BIT6 OF LKS
23065  126126  001001                            BNE     3$
23066  126130  104000                            EMT                     ;
23067  126132  042777  000100  176510  3$:       BIC     #BIT6,@LKS      ;CLEAR BIT6 OF LKS
23068  126140  032777  000100  176502            BIT     #BIT6,@LKS      ;TEST BIT6 OF LK
23069  126146  001401                            BEQ     4$
23070  126150  104000                            EMT                     ;
23071  126152  032737  000001  001020  4$:       BIT     #1,@#$ENV       ;ARE WE RUNNING UNDER APT
23072  126160  001403                            BEQ     70$             ;IF NO THEN DO TEST
23073  126162  005737  001006                    TST     @#$PASS         ;IS THIS FIRST PASS
23074  126166  001011                            BNE     5$              ;IF NO SKIP TO TEST END
23075  126170                            70$:
23076  126170  052777  000100  176452            BIS     #BIT6,@LKS      ;SET BIT6 OF LKS
23077  126176  000005                            RESET                   ;CLEAR BIT6 OF LKS WITH RESET
23078  126200  032777  000100  176442            BIT     #BIT6,@LKS      ;TEST BIT6 OF LKS
```

```
23079  126206  001401                          BEQ     5$
23080  126210  104000                          EMT
23081  126212  010377  176434          5$:     MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
23082
23083
23084                                  ;*****************************************************************************
23085                                  ;TEST 626       TEST THAT THE REAL TIME CLOCK INTERRUPTS PROPERLY
23086                                  ;*****************************************************************************
23087  126216                          TS626:
23088
23089  126216  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
23090  126222  017703  176424                  MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
23091  126226  017704  176422                  MOV     @RTCPSW,R4      ;SAVE LINE CLOCK PSW VECTOR
23092  126232  012777  126274  176412          MOV     #ESR51,@RTCVT   ;SET RTC INTERRUPT VECTOR TO ERROR REPORT
23093  126240  012777  000340  176406          MOV     #340,@RTCPSW    ;KEEP PRIORITY AT 7
23094  126246  052777  000100  176374          BIS     #BIT6,@LKS      ;SET INTERRUPT ENABLE
23095
23096  126254  012701  024000                  MOV     #24000,R1               ;SET UP A WAIT LOOP
23097  126260  077101                  ESR36:  SOB     R1,ESR36                ;WAIT 30 MILLISEC
23098  126262  012777  126276  176362          MOV     #ESR37,@RTCVT           ;ALTER VECTOR
23099  126270  106427  000240                  MTPS    #240            ;PRIORITY NOW TO FIVE
23100  126274  104000                  ESR51:  EMT
23101  126276  012777  126314  176346  ESR37:  MOV     #ESR38,@RTCVT
23102  126304  012701  024000                  MOV     #24000,R1
23103  126310  077101                  ESR39:  SOB     R1,ESR39        ;WAIT 30 MORE MILLISEC
23104  126312  000401                          BR      ESR38+2
23105  126314  104000                  ESR38:  EMT                     ;AN ERROR IF WE ARE HERE
23106  126316  005077  176326                  CLR     @LKS            ;CLR INTERRUPT ENABLE
23107  126322  012701  024000                  MOV     #24000,R1
23108  126326  077101                  ESR52:  SOB     R1,ESR52        ;WAIT LOOP
23109  126330  106427  000240                  MTPS    #240                    ;ALTER PRIORITY TO FIVE
23110  126334  012701  024000                  MOV     #24000,R1
23111  126340  077101                  ESR53:  SOB     R1,ESR53        ;WAIT AGAIN
23112  126342  012777  126366  176302          MOV     #ESR55,@RTCVT
23113  126350  052777  000100  176272          BIS     #BIT6,@LKS              ;ENABLE LTC INTERRUPTS
23114  126356  012701  024000                  MOV     #24000,R1
23115  126362  077101                  ESR54:  SOB     R1,ESR54
23116  126364  104000                          EMT                             ;SHOULD HAVE INTERRUPTED
23117
23118  126366  022626                  ESR55:  CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
23119  126370  042777  000100  176252          BIC     #BIT6,@LKS      ;DISABLE INTERRUPTS
23120  126376  010377  176250                  MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
23121  126402  010477  176246                  MOV     R4,@RTCPSW      ;RESTORE LINE CLOCK PSW VECTOR
23122
23123
23124
23125
23126
23127                                  ;*****************************************************************************
23128                                  ;TEST 627       TEST RTC FOR DOUBLE INTERRUPTS
23129                                  ;*****************************************************************************
23130  126406                          TS627:
23131  126406  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
23132  126414  001403                          BEQ     70$             ;IF NO THEN DO TEST
23133  126416  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
23134  126422  001045                          BNE     TS630           ;IF NO THEN SHIP TO NEXT TEST
```

```
23135  126424
23136  126424  017703  176222          70$:    MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
23137  126430  017704  176220                  MOV     @RTCPSW,R4      ;SAVE LINE CLOCK PSW VECTOR
23138  126434  012777  126476  176210          MOV     #2$,@RTCVT      ;SET UP RTC INTERRUPT VECTOR
23139  126442  012777  000340  176204          MOV     #340,@RTCPSW    ;DISALLOW INTERRUPTS AFTER THE INTERRUPT
23140  126450  106427  000240                  MTPS    #240            ;SET PSW TO PRIORITY 5
23141
23142  126454  005000                          CLR     R0
23143  126456  052777  000100  176164          BIS     #BIT6,@LKS      ;ENABLE CLOCK INTERRUPTS
23144  126464  005200                  1$:     INC     R0
23145  126466  005700                          TST     R0
23146  126470  100375                          BPL     1$
23147  126472  000240                          NOP                     ;GIVE TIME FOR ANY INTERRUPT
23148
23149  126474  104000                          EMT                     ;RTC INTERRUPT DID NOT OCCUR
23150
23151  126476  022626                  2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
23152  126500  012777  126516  176144          MOV     #3$,@RTCVT      ;POINT RTC VECTOR TO ERROR REPORT
23153  126506  106427  000240                  MTPS    #240            ;SET PSW TO PRIORITY 5
23154  126512  000240                          NOP                     ;GIVE SOME TIME FOR AN INTERRUPT
23155  126514  000401                          BR      4$
23156  126516                          3$:
23157  126516  104000                          EMT                     ;
23158  126520  042777  000100  176122  4$:     BIC     #BIT6,@LKS      ;DISABLE CLOCK INTERRUPTS
23159  126526  010377  176120                  MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
23160  126532  010477  176116                  MOV     R4,@RTCPSW      ;RESTORE LINE CLOCK PSW VECTOR
23161
23162
23163                          ;*****************************************************************************
23164                          ;TEST 630       TEST THAT RTC INTERRUPT CLEARS WITH RESET
23165                          ;*****************************************************************************
23166  126536                  TS630:
23167  126536  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
23168  126544  001403                          BEQ     70$             ;IF NO THEN DO TEST
23169  126546  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
23170  126552  001113                          BNE     TS631           ;IF NO THEN SHIP TO NEXT TEST
23171  126554                          70$:
23172  126554  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
23173  126560  017703  176066                  MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
23174  126564  012777  126630  176060          MOV     #2$,@RTCVT      ;POINT RTC VECTOR TO ERROR REPORT
23175  126572  005000                          CLR     R0
23176
23177  126574  052777  000100  176046          BIS     #BIT6,@LKS      ;ENABLE CLOCK INTERRUPTS
23178  126602  005200                  1$:     INC     R0
23179  126604  005700                          TST     R0
23180  126606  100375                          BPL     1$
23181  126610  000005                          RESET                   ;CLEAR PENDING INTERRUPT WITH RESET
23182  126612  106427  000240                  MTPS    #240            ;SET PSW TO PRIORITY 5
23183  126616  000240                          NOP                     ;GIVE TIME FOR ANY INTERRUPT
23184  126620  042777  000100  176022          BIC     #BIT6,@LKS      ;DISALLOW INTERRUPTS
23185  126626  000401                          BR      3$
23186  126630                          2$:
23187  126630  104000                          EMT                     ;
23188  126632  010377  176014          3$:     MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
23189  126636  000444                          BR      SLU2ST
23190
```

```
23191
23192
23193  126640  012737  000005  001002  ERROR6: MOV     #5,@#$FATAL                     ;SET UP FATAL ERROR NUMBER
23194  126646  012767  000001  052124          MOV     #1,$MSGTY                       ;SET FATAL ERROR FLAG
23195  126654  032737  000001  001020          BIT     #1,@#$ENV                       ;UNDER APT /
23196  126662  001004                          BNE     LTCHLT
23197  126664  012700  126676                  MOV     #LTCMSG,R0
23198  126670  004767  004434                  JSR     PC,TYPE
23199  126674  000777                  LTCHLT: BR      .
23200  126676  040506  046111  051125  LTCMSG: .ASCIZ   /FAILURE DURING LTC TEST/<12><15>
23201  126704  020105  052504  044522
23202  126712  043516  046040  041524
23203  126720  052040  051505  005124
23204  126726  000015
23205                                   .EVEN
23206
23207                                   ;SERIAL LINE UNIT REGISTER AND VECTOR ADDRESSES FOR SLU2
23208
23209  126730  176500                  RCSR2:  176500                  ;ADDRESS OF RECEIVER COMMAND/STATUS REGISTER
23210  126732  176502                  RBUF2:  176502                  ;ADDRESS OF RECEIVER BUFFER
23211  126734  176504                  TCSR2:  176504                  ;ADDRESS OF TRANSMITTER COMMAND/STATUS REGISTER
23212  126736  176506                  TBUF2:  176506                  ;ADDRESS OF TRANSMITTER BUFFER
23213  126740  000300                  RVECT2: 300                     ;RECEIVER INTERRUPT VECTOR
23214  126742  000302                  RPSW2:  302
23215  126744  000304                  TVECT2: 304                     ;TRANSMITTER INTERRUPT VECTOR
23216  126746  000306                  TPSW2:  306
23217
23218  126750  000244                  SLU2ST: CLZ
23219  126752  032777  000020  072424          BIT     #20,@SWR
23220  126756  001402                          BEQ     1$
23221  126760  000167  002622                  JMP     UNIQUE
23222  126766  012737  000006  001004  1$:     MOV     #6,@#$TESTN     ;PUT TEST NUMBER IN MAILBOX
23223  126774  012737  131504  000030          MOV     #ERROR7,@#30    ;SET UP FOR CORRECT ERROR CALL
23224
23225
23226                                   ;*****************************************************************************
23227                                   ;TEST 631       TEST ABILITY TO REFERENCE TCSR2
23228                                   ;*****************************************************************************
23229  127002                          TS631:
23230  127002  013703  000004                  MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
23231  127006  012737  127022  000004          MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
23232  127014  005777  177714                  TST     @TCSR2          ;REFERENCE THE XMIT COMMAND/STATUS REG.
23233  127020  000401                          BR      4$
23234  127022                          1$:
23235  127022  104000                          EMT                     ;
23236  127024  010337  000004          4$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
23237
23238
23239
23240                                   ;*****************************************************************************
23241                                   ;TEST 632       TEST ABILITY TO REFERENCE TBUF2
23242                                   ;*****************************************************************************
23243  127030                          TS632:
23244  127030  013703  000004                  MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
23245  127034  012737  127050  000004          MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
23246  127042  005777  177670                  TST     @TBUF2          ;REFERENCE THE XMIT BUFFER
```

```
 23247  127046  000401                          BR      4$
 23248  127050                          1$:
 23249  127050  104000                          EMT                     ;
 23250  127052  010337  000004          4$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
 23251
 23252
 23253                                  ;*************************************************************************************
 23254                                  ;TEST 633       TEST THAT TCSR2 BIT7(DONE) CLEARS WHEN XBUF IS LOADED
 23255                                  ;*************************************************************************************
 23256  127056                          TS633:
 23257  127056  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
 23258  127064  001403                          BEQ     70$             ;IF NO THEN DO TEST
 23259  127066  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
 23260  127072  001022                          BNE     TS634           ;IF NO THEN SHIP TO NEXT TEST
 23261  127074                          70$:
 23262  127074  005077  177636                  CLR     @TBUF2          ;LOAD XBUF
 23263  127100  105777  177630                  TSTB    @TCSR2          ;CHECK DONE
 23264  127104  100006                          BPL     3$              ;BR IF CLEAR
 23265                                                                  ;FILL SECOND BUFFER BECUASE REFRESH COULD CAUSE
 23266                                                                  ;FIRST TEST TO FAIL
 23267  127106  005077  177624                  CLR     @TBUF2          ;FILL DOUBLE BUFFER
 23268  127112  105777  177616                  TSTB    @TCSR2          ;CHECK DONE
 23269  127116  100001                          BPL     3$
 23270  127120  104000                          EMT                     ;
 23271  127122  005000                  3$:     CLR     R0              ;CLEAR TIMER
 23272  127124  105777  177604          4$:     TSTB    @TCSR2          ;CHECK FOR XMIT DONE
 23273  127130  100403                          BMI     5$              ;IF DONE SETS, BR TO END OF TEST
 23274  127132  005200                          INC     R0              ;INCREMENT TIMER
 23275  127134  001373                          BNE     4$
 23276  127136  104000                          EMT                     ;
 23277  127140                          5$:
 23278
 23279
 23280                                  ;*************************************************************************************
 23281                                  ;TEST 634       TEST THAT TCSR2 'DONE'' SETS WITH RESET
 23282                                  ;*************************************************************************************
 23283  127140                          TS634:
 23284  127140  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
 23285  127146  001403                          BEQ     70$             ;IF NO THEN DO TEST
 23286  127150  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
 23287  127154  001015                          BNE     TS635           ;IF NO THEN SHIP TO NEXT TEST
 23288  127156                          70$:
 23289  127156  005077  177554                  CLR     @TBUF2          ;LOAD TRANSMIT BUFFER
 23290  127162  105777  177546          1$:     TSTB    @TCSR2          ;WAIT FOR DONE
 23291  127166  100375                          BPL     1$
 23292  127170  005077  177542                  CLR     @TBUF2          ;LOAD SECOND BUFFER
 23293  127174  000240                          NOP
 23294  127176  000005                          RESET                   ;SET DONE WITH RESET
 23295  127200  105777  177530                  TSTB    @TCSR2          ;CHECK FOR DONE SET
 23296  127204  100401                          BMI     TS635
 23297  127206  104000                          EMT                     ;
 23298
 23299
 23300
 23301                                  ;*************************************************************************************
 23302                                  ;TEST 635       TEST ABILITY TO ACCESS RCSR2
```

```
23303                                   ;*****************************************************************************
23304   127210                          TS635:
23305   127210  013703  000004          MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
23306   127214  012737  127230  000004  MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
23307   127222  005777  177502          TST     @RCSR2          ;ACCESS RCSR
23308   127226  000401                  BR      2$
23309   127230                  1$:
23310   127230  104000                  EMT                     ;
23311   127232  010337  000004  2$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
23312
23313
23314                                   ;*****************************************************************************
23315                                   ;TEST 636       TEST ABILITY TO ACCESS RBUF2
23316                                   ;*****************************************************************************
23317   127236                          TS636:
23318   127236  013703  000004          MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
23319   127242  012737  127256  000004  MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
23320   127250  005777  177456          TST     @RBUF2          ;ACCESS RBUF
23321   127254  000401                  BR      2$
23322   127256                  1$:
23323   127256  104000                  EMT                     ;
23324   127260  010337  000004  2$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
23325
23326
23327
23328
23329
23330
23331                                   ;*****************************************************************************
23332                                   ;TEST 637       TEST THAT BIT0(BREAK BIT) CAN BE SET & CLEARED & RESET
23333                                   ;*****************************************************************************
23334   127264                          TS637:
23335   127264  032777  000001  177442          BIT     #BIT0,@TCSR2    ;CHECK BIT0 OF TCSR CLEAR
23336   127272  001401                          BEQ     3$
23337   127274  104000                          EMT                     ;
23338   127276  052777  000001  177430  3$:     BIS     #BIT0,@TCSR2    ;SET BIT0 IN TCSR
23339   127304  032777  000001  177422          BIT     #BIT0,@TCSR2    ;TEST BIT0 OF TCSR
23340   127312  001001                          BNE     4$
23341   127314  104000                          EMT                     ;
23342   127316  042777  000001  177410  4$:     BIC     #BIT0,@TCSR2    ;CLEAR BIT0 OF TCSR
23343   127324  032777  000001  177402          BIT     #BIT0,@TCSR2    ;TEST BIT0 OF TCSR
23344   127332  001401                          BEQ     7$
23345   127334  104000                          EMT                     ;
23346   127336                          7$:
23347   127336  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
23348   127344  001403                          BEQ     70$             ;IF NO THEN DO TEST
23349   127346  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
23350   127352  001011                          BNE     TS640           ;IF NO THEN SHIP TO NEXT TEST
23351   127354                          70$:
23352   127354  052777  000001  177352          BIS     #BIT0,@TCSR2    ;SET BIT0 IN TCSR
23353   127362  000005                          RESET                   ;CLEAR BIT0 WITH RESET
23354   127364  032777  000001  177342          BIT     #BIT0,@TCSR2    ;TEST BIT0 CLEAR
23355   127372  001401                          BEQ     TS640
23356   127374  104000                          EMT                     ;
23357
23358
```

```
23359                                   ;*****************************************************************************
23360                                   ;TEST 640       TEST THAT BIT6(XMIT INT EN) CAN BE SET & RESET
23361                                   ;*****************************************************************************
23362  127376                           TS640:
23363  127376  017703  177342                  MOV     @TVECT2,R3      ;SAVE XMIT VECTOR
23364  127402  012777  127424  177334          MOV     #1$,@TVECT2     ;SET UP INTERRUPT VECTOR FOR ERROR REPORT
23365  127410  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
23366  127414  032777  000100  177312          BIT     #BIT6,@TCSR2    ;TEST BIT6 OF TCSR
23367  127422  001401                          BEQ     2$
23368  127424                           1$:
23369  127424  104000                          EMT                     ;
23370  127426  052777  000100  177300  2$:     BIS     #BIT6,@TCSR2    ;SET BIT6 OF TCSR
23371  127434  032777  000100  177272          BIT     #BIT6,@TCSR2    ;TEST BIT6 OF TCSR
23372  127442  001001                          BNE     3$
23373  127444  104000                          EMT                     ;
23374  127446  042777  000100  177260  3$:     BIC     #BIT6,@TCSR2    ;CLEAR BIT6 OF TCSR
23375  127454  032777  000100  177252          BIT     #BIT6,@TCSR2    ;TEST BIT6 OF TCSR
23376  127462  001401                          BEQ     4$
23377  127464  104000                          EMT                     ;
23378  127466  032737  000001  001020  4$:     BIT     #1,@#$ENV       ;ARE WE RUNNING UNDER APT
23379  127474  001403                          BEQ     70$             ;IF NO THEN DO TEST
23380  127476  005737  001006                  TST     @#$PASS         ;IF THIS FIRST PASS
23381  127502  001011                          BNE     5$              ;IF NO THEN SKIP TO END OF TEST
23382  127504                           70$:
23383  127504  052777  000100  177222          BIS     #BIT6,@TCSR2    ;SET BIT6 OF TCSR
23384  127512  000005                          RESET                   ;CLEAR BIT6 WITH RESET
23385  127514  032777  000100  177212          BIT     #BIT6,@TCSR2    ;TEST BIT6 OF TCSR
23386  127522  001401                          BEQ     5$
23387  127524  104000                          EMT                     ;
23388  127526  010377  177212          5$:     MOV     R3,@TVECT2      ;RESTORE XMIT VECTOR
23389
23390
23391                                   ;*****************************************************************************
23392                                   ;TEST 641       TEST THAT BIT6 OF RCSR2 CAN BE SET & RESET
23393                                   ;*****************************************************************************
23394  127532                           TS641:
23395  127532  017703  177202                  MOV     @RVECT2,R3      ;SAVE RECEIVE VECTOR
23396  127536  012777  127560  177174          MOV     #1$,@RVECT2     ;SET UP INTERRUPT VECTOR FOR ERROR REPORT
23397  127544  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
23398  127550  032777  000100  177152          BIT     #BIT6,@RCSR2    ;TEST BIT6 OF RCSR
23399  127556  001401                          BEQ     2$
23400  127560                           1$:
23401  127560  104000                          EMT                     ;
23402  127562  052777  000100  177140  2$:     BIS     #BIT6,@RCSR2    ;SET BIT6 OF RCSR
23403  127570  032777  000100  177132          BIT     #BIT6,@RCSR2    ;TEST BIT6 OF RCSR
23404  127576  001001                          BNE     3$
23405  127600  104000                          EMT                     ;
23406  127602  042777  000100  177120  3$:     BIC     #BIT6,@RCSR2    ;CLEAR BIT6 OF RCSR
23407  127610  032777  000100  177112          BIT     #BIT6,@RCSR2    ;TEST BIT6 OF RCSR
23408  127616  001401                          BEQ     4$
23409  127620  104000                          EMT                     ;
23410  127622  032737  000001  001020  4$:     BIT     #1,@#$ENV       ;ARE WE RUNNING UNDER APT
23411  127630  001403                          BEQ     70$             ;IF NO THEN DO TEST
23412  127632  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
23413  127636  001011                          BNE     5$              ;IF NO THEN SKIP TO END OF TEST
23414  127640                           70$:
```

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23415  127640  052777  000100  177062          BIS     #BIT6,@RCSR2    ;SET BIT6 OF RCSR
23416  127646  000005                          RESET                   ;CLEAR BIT6OF RCSR2 WITH RESET
23417  127650  032777  000100  177052          BIT     #BIT6,@RCSR2    ;TEST BIT6 OF RCSR
23418  127656  001401                          BEQ     5$
23419  127660  104000                          EMT                     ;
23420  127662  010377  177052          5$:     MOV     R3,@RVECT2      ;RESTORE RECEIVE VECTOR
23421
23422
23423
23424                                  ;*************************************************************************************
23425                                  ;TEST 642       TEST THAT XMIT INTERRUPTS ONLY WHEN ENABLED
23426                                  ;*************************************************************************************
23427  127666                          TS642:
23428  127666  042777  000100  177040          BIC     #BIT6,@TCSR2    ;CLEAR TRANSMIT INTERRUPT ENABLE
23429  127674  017703  177044                  MOV     @TVECT2,R3      ;SAVE XMIT VECTOR
23430  127700  012777  127722  177036          MOV     #2$,@TVECT2     ;POINT XMIT VECTOR TO ERROR REPORT
23431  127706  105777  177022          1$:     TSTB    @TCSR2          ;WAIT FOR DONE
23432  127712  100375                          BPL     1$
23433  127714  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23434  127720  000401                          BR      3$
23435  127722                          2$:
23436  127722  104000                          EMT                     ;
23437  127724  012777  127744  177012  3$:     MOV     #4$,@TVECT2     ;SET XMIT VECTOR TO END OF TEST
23438  127732  052777  000100  176774          BIS     #BIT6,@TCSR2    ;ENABLE INTERRUPTS
23439  127740  000240                          NOP
23440
23441  127742  104000                          EMT                     ;XMIT DID NOT INTERRUPT
23442
23443  127744  042777  000100  176762  4$:     BIC     #BIT6,@TCSR2    ;DISABLE INTERRUPTS
23444  127752  022626                          CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
23445  127754  010377  176764                  MOV     R3,@TVECT2      ;RESTORE XMIT VECTOR
23446
23447
23448                                  ;*************************************************************************************
23449                                  ;TEST 643       TEST THAT XMIT INTERRUPTS DO NOT OCCUR WHEN DISABLED
23450                                  ;*************************************************************************************
23451  127760                          TS643:
23452  127760  042777  000100  176746          BIC     #BIT6,@TCSR2    ;DISABLE INTERRUPTS
23453  127766  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
23454  127772  017703  176746                  MOV     @TVECT2,R3      ;SAVE XMIT VECTOR
23455  127776  012777  130024  176740          MOV     #2$,@TVECT2     ;POINT XMIT VECTOR TO ERROR REPORT
23456  130004  105777  176724          1$:     TSTB    @TCSR2          ;WAIT FOR DONE
23457  130010  100375                          BPL     1$
23458  130012  052777  000100  176714          BIS     #BIT6,@TCSR2    ;ENABLE INTERRUPT
23459  130020  000240                          NOP
23460  130022  000401                          BR      3$
23461  130024                          2$:
23462  130024  104000                          EMT                     ;
23463  130026  042777  000100  176700  3$:     BIC     #BIT6,@TCSR2    ;CLEAR INTERRUPT ENABLE
23464  130034  012777  130052  176702          MOV     #4$,@TVECT2     ;POINT XMIT VECTOR TO ERROR REPORT
23465  130042  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23466  130046  000240                          NOP
23467  130050  000401                          BR      5$
23468  130052                          4$:
23469  130052  104000                          EMT                     ;
23470  130054  010377  176664          5$:     MOV     R3,@TVECT2      ;RESTORE XMIT VECTOR
```

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23471
23472
23473                                   ;*****************************************************************************
23474                                   ;TEST 644       TEST TRANSMITTER FOR DOUBLE INTERRUPTS
23475                                   ;*****************************************************************************
23476  130060                           TS644:
23477  130060  042777  000100  176646           BIC     #BIT6,@TCSR2    ;CLEAR INTERRUPT ENABLE
23478  130066  017703  176652           MOV     @TVECT2,R3      ;SAVE XMIT VECTOR
23479  130072  017704  176650           MOV     @TPSW2,R4       ;SAVE XMIT PSW VECTOR
23480  130076  012777  130136  176640   MOV     #2$,@TVECT2     ;SET UP XMIT VECTOR
23481  130104  012777  000340  176634   MOV     #340,@TPSW2     ;SET PIO 7 AFTER INTERRUPT
23482  130112  106427  000140           MTPS    #140            ;SET PSW TO PRIORITY 3
23483  130116  105777  176612   1$:     TSTB    @TCSR2          ;WAIT FOR DONE
23484  130122  100375                   BPL     1$
23485  130124  052777  000100  176602   BIS     #BIT6,@TCSR2    ;ENABLE INTERRUPTS
23486  130132  000240                   NOP
23487
23488  130134  104000                   EMT                     ;
23489                                                            ;XMIT INTERRUPT DID NOT OCCUR
23490  130136  022626           2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
23491  130140  012777  130164  176576   MOV     #4$,@TVECT2     ;POINT XMIT VECTOR TO ERROR
23492  130146  106427  000140           MTPS    #140            ;SET PSW TO PRIORITY 3
23493  130152  000240                   NOP                     ;GIVE TIME FOR ANY INTERRUPTS
23494  130154  042777  000100  176552   BIC     #BIT6,@TCSR2    ;DISABLE INTERRUPTS
23495  130162  000401                   BR      5$
23496  130164                   4$:
23497  130164  104000                   EMT                     ;
23498  130166  010377  176552   5$:     MOV     R3,@TVECT2      ;RESTORE XMIT VECTOR
23499  130172  010477  176550           MOV     R4,@TPSW2       ;RESTORE XMIT PSW VECTOR
23500
23501                                   ;*****************************************************************************
23502                                   ;TEST 645       TEST THAT XMIT INTERRUPT CLEARS WITH LOADING TBUF2
23503                                   ;*****************************************************************************
23504  130176                           TS645:
23505  130176  032737  000001  001020           BIT     #1, @#SENV      ;ARE WE RUNNING UNDER APT
23506  130204  001403                   BEQ     70$             ;IF NO THEN DO TEST
23507  130206  005737  001006           TST     @#SPASS         ;IS THIS FIRST PASS
23508  130212  001043                   BNE     TS646           ;IF NO THEN SHIP TO NEXT TEST
23509  130214                   70$:
23510  130214  042777  000100  176512           BIC     #BIT6,@TCSR2    ;DISABLE INTERRUPTS
23511  130222  106427  000340           MTPS    #340            ;SET PSW TO PRIORITY 7
23512  130226  017703  176512           MOV     @TVECT2,R3      ;SAVE XMIT VECTOR
23513  130232  012777  130302  176504   MOV     #2$,@TVECT2     ;POINT XMIT VECTOR TO ERROR
23514  130240  052777  000100  176466   BIS     #BIT6,@TCSR2    ;ENABLE INTERRUPTS
23515  130246  005077  176464           CLR     @TBUF2          ;LOAD TBUF
23516  130252  105777  176456   1$:     TSTB    @TCSR2          ;WAIT FOR DONE (INTERRUPT)
23517  130256  100375                   BPL     1$
23518  130260  005077  176452           CLR     @TBUF2          ;FILL SECOND BUFFER TO RESET INT.
23519  130264  106427  000140           MTPS    #140            ;SET PSW TO PRIORITY 3
23520  130270  000240                   NOP                     ;GIVE TIME FOR ANY INTERRUPTS
23521  130272  042777  000100  176434   BIC     #BIT6,@TCSR2    ;DISABLE INTERRUPTS
23522  130300  000401                   BR      3$
23523  130302                   2$:
23524  130302  104000                   EMT                     ;
23525  130304  010377  176434   3$:     MOV     R3,@TVECT2      ;RESTORE XMIT VECTOR
23526  130310  005000                   CLR     R0              ;INIT LOOP COUNTER
```

```
23527  130312  005200                  4$:     INC     R0              ;INCREMENT COUNTER
23528  130314  001376                          BNE     4$              ;UNTIL COUNTER = 0
23529  130316  005777  176410                  TST     @RBUF2          ;CLEAR RECEIVER BUFFER
23530
23531
23532                                  ;*************************************************************************
23533                                  ;TEST 646       TEST THAT RCVR DONE (7) SET & CLEAR PROPERLY
23534                                  ;*************************************************************************
23535  130322                          TS646:
23536  130322  005000                          CLR     R0              ;CLEAR A TIMER
23537  130324  005077  176406                  CLR     @TBUF2          ;LOAD TRANSMIT BUFFER
23538  130330  105777  176374          WDONE2: TSTB    @RCSR2          ;CHECK FOR RECEIVER DONE
23539  130334  100403                          BMI     6$              ;BR, IF DONE
23540  130336  005200                          INC     R0              ;INCREMENT TIMER, IF NOT DONE
23541  130340  001373                          BNE     WDONE2
23542  130342  104000                          EMT                     ;RECEIVER DONE NEVER SET
23543
23544  130344  032737  000001  001020  6$:     BIT     #1,@#$ENV       ;ARE WE RUNNING UNDER APT
23545  130352  001403                          BEQ     70$             ;IF NO THEN DO TEST
23546  130354  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
23547  130360  001005                          BNE     2$              ;IF NO THEN SKIP TO END OF TEST
23548  130362                          70$:
2354?  130362  000005                          RESET                   ;CLEAR DONE WITH RESET
2355)  130364  105777  176340                  TSTB    @RCSR2          ;CHECK FOR DONE CLEAR
235"1  130370  001401                          BEQ     2$
23552  130372  104000                          EMT                     ;RESET DID NOT CLEAR RCVR DONE
23553  130374  005000                  2$:     CLR     R0              ;INIT LOOP COUNTER
23554  130376  005200                  3$:     INC     R0              ;INCREMENT COUNTER
23555  130400  001376                          BNE     3$              ;UNTIL COUNTER = 0
23556  130402  005777  176324                  TST     @RBUF2          ;CLEAR RECEIVER BUFFER
23557
23558
23559                                  ;*************************************************************************
23560                                  ;TEST 647       TEST THAT READING RBUF2 CLEARS RECEIVER DONE
23561                                  ;*************************************************************************
23562  130406                          TS647:
23563  130406  005077  176324                  CLR     @TBUF2          ;LOAD TRANSMITTER
23564  130412  105777  176312          1$:     TSTB    @RCSR2          ;WAIT FOR RECEIVER DONE
23565  130416  100375                          BPL     1$
23566  130420  017700  176306                  MOV     @RBUF2,R0       ;READ RECEIVE BUFFER
23567  130424  105777  176300                  TSTB    @RCSR2          ;CHECK FOR RECEIVE DONE CLEAR
23568  130430  001401                          BEQ     TS650
23569  130432  104000                          EMT                     ;
23570                                                                  ;READING RBUF2 DID NOT CLEAR RCVR DONE
23571
23572
23573                                  ;*************************************************************************
23574                                  ;TEST 650       TEST THAT RCVR INTERRUPTS ONLY WHEN ENABLED
23575                                  ;*************************************************************************
23576  130434                          TS650:
23577  130434  042777  000100  176272          BIC     #BIT6,@TCSR2    ;DISABLE TRANSMIT INTERRUPTS
23578  130442  042777  000100  176260          BIC     #BIT6,@RCSR2    ;DISABLE RECEIVER INTERRUPTS
23579  130450  017703  176264                  MOV     @RVECT2,R3      ;SAVE RECEIVE VECTOR
23580  130454  012777  130502  176256          MOV     #2$,@RVECT2     ;POINT RCV VECTOR TO ERROR REPORT
23581  130462  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23582  130466  005077  176c44                  CLR     @TBUF2          ;SEND A CHARACTER
```

```
23583  130472  105777  176232          1$:     TSTB    @RCSR2          ;WAIT FOR RECEIVER DONE
23584  130476  100375                          BPL     1$
23585  130500  000401                          BR      3$
23586  130502                          2$:
23587  130502  104000                          EMT                     ;
23588  130504  012777  130524  176226  3$:     MOV     #4$,@RVECT2     ;POINT RCV VECTOR TO END OF TEST
23589  130512  052777  000100  176210          BIS     #BIT6,@RCSR2    ;ENABLE RCV INTERRUPTS
23590  130520  000240                          NOP                     ;GIVE ANY INTERRUPTS TIME
23591  130522  104000                          EMT                     ;
23592  130524  042777  000100  176176  4$:     BIC     #BIT6,@RCSR2    ;DISABLE INTERRUPTS
23593  130532  022626                          CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
23594  130534  005777  176172                  TST     @RBUF2          ;CLEAR CHARACTER FROM RECEIVER BUFFER
23595  130540  010377  176174                  MOV     R3,@RVECT2      ;RESTORE RECEIVE VECTOR
23596
23597
23598                                  ;*************************************************************************
23599                                  ;TEST 651       TEST THAT RCVR INTERRUPTS DO NOT OCCUR WHEN DISABLED
23600                                  ;*************************************************************************
23601  130544                          TS651:
23602  130544  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
23603  130550  017703  176164                  MOV     @RVECT2,R3      ;SAVE RECEIVE VECTOR
23604  130554  012777  130606  176156          MOV     #2$,@RVECT2     ;POINT RCVR VECTOR TO ERROR REPORT
23605  130562  005077  176150                  CLR     @TBUF2          ;SEND A CHARACTER
23606  130566  105777  176136          1$:     TSTB    @RCSR2          ;WAIT FOR RECEIVER DONE
23607  130572  100375                          BPL     1$
23608  130574  052777  000100  176126          BIS     #BIT6,@RCSR2    ;ENABLE INTERRUPTS
23609  130602  000240                          NOP                     ;GIVE TIME FOR INTERRUPT
23610  130604  000401                          BR      3$
23611  130606                          2$:
23612  130606  104000                          EMT                     ;RCVR INTERRUPTS AT PRIORITY 7
23613  130610  042777  000100  176112  3$:     BIC     #BIT6,@RCSR2    ;CLEAR INTERRUPT ENABLE
23614  130616  012777  130634  176114          MOV     #4$,@RVECT2     ;POINT RCVR VECTOR TO ERROR REPORT
23615  130624  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23616  130630  000240                          NOP                     ;GIVE TIME FOR ANY INTERRUPT
23617  130632  000401                          BR      5$
23618  130634                          4$:
23619  130634  104000                          EMT                     ;RCVR INTERRUPT REQUEST PASSED WITH BIT6 CLEAR
23620  130636  005777  176070          5$:     TST     @RBUF2          ;CLEAR CHARACTER FROM RECEIVER BUFFER
23621  130642  010377  176072                  MOV     R3,@RVECT2      ;RESTORE RECEIVE VECTOR
23622
23623
23624                                  ;*************************************************************************
23625                                  ;TEST 652       TEST RECEIVER FOR DOUBLE INTERRUPTS
23626                                  ;*************************************************************************
23627  130646                          TS652:
23628  130646  017703  176066                  MOV     @RVECT2,R3      ;SAVE RECEIVE VECTOR
23629  130652  017704  176064                  MOV     @RPSW2,R4       ;SAVE RECEIVE PSW VECTOR
23630  130656  012777  130722  176054          MOV     #2$,@RVECT2     ;POINT RCV VECTOR TO CONTINUE TEST
23631  130664  012777  000340  176050          MOV     #340,@RPSW2     ;SET PRIORITY TO 7 AFTER INTERRUPT
23632  130672  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23633  130676  005077  176034                  CLR     @TBUF2          ;SEND A CHARACTER
23634  130702  105777  176022          1$:     TSTB    @RCSR2          ;WAIT FOR RCVR DONE
23635  130706  100375                          BPL     1$
23636  130710  052777  000100  17601?          BIS     #BIT6,@RCSR2    ;ENABLE RCV INTERRUPTS
23637  130716  000240                          NOP                     ;GIVE SOME TIME
23638  130720  104000                          EMT                     ;
```

```
23639  130722  022626                  2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
23640  130724  012777  130760  176006          MOV     #3$,@RVECT2     ;POINT RCV VECTOR TO ERROR REPORT
23641  130732  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23642  130736  000240                          NOP                     ;GIVE SOME TIME
23643  130740  042777  000100  175762          BIC     #BIT6,@RCSR2    ;CLEAR INTERRUPT ENABLE
23644  130746  010377  175766                  MOV     R3,@RVECT2      ;RESTORE RECEIVE VECTOR
23645  130752  010477  175764                  MOV     R4,@RPSW2       ;RESTORE RECEIVE PSW VECTOR
23646  130756  000401                          BR      4$
23647  130760                          3$:
23648  130760  104000                          EMT                     ;
23649  130762  005777  175744          4$:     TST     @RBUF2          ;CLEAR CHARACTER FROM RECEIVER BUFFER
23650  130766  010377  175746                  MOV     R3,@RVECT2      ;RESTORE RECEIVE VECTOR
23651
23652
23653                                  ;*******************************************************************************
23654                                  ;TEST 653       TEST THAT RCVR INTERRUPT CLEARS BY READING RBUF2
23655                                  ;*******************************************************************************
23656  130772                          TS653:
23657  130772  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
23658  130776  017703  175736                  MOV     @RVECT2,R3      ;SAVE RECEIVE VECTOR
23659  131002  012777  131052  175730          MOV     #2$,@RVECT2     ;POINT RCV VECTOR TO ERROR REPORT
23660  131010  052777  000100  175712          BIS     #BIT6,@RCSR2    ;SET RCVR INTERRUPT ENABLE
23661  131016  005077  175714                  CLR     @TBUF2          ;SEND A CHARACTER
23662  131022  105777  175702          1$:     TSTB    @RCSR2          ;WAIT FOR DONE (INTERRUPT)
23663  131026  100375                          BPL     1$
23664  131030  005777  175676                  TST     @RBUF2          ;READ RBUF TO CLEAR PENDING INTERRPUT
23665  131034  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23666  131040  000240                          NOP                     ;ALLOW TIME FOR ANY ERRONEOUS INTERRUPT
23667  131042  042777  000100  175660          BIC     #BIT6,@RCSR2    ;NO INTERRUPT-CLEAR INT. ENABLE
23668  131050  000401                          BR      3$
23669  131052                          2$:
23670  131052  104000                          EMT                     ;
23671  131054  010377  175660          3$:     MOV     R3,@RVECT2      ;RESTORE RECEIVE VECTOR
23672
23673
23674
23675                                  ;*******************************************************************************
23676                                  ;TEST 654       TEST THAT RESET CLEARS RECEIVE INTERRUPT
23677                                  ;*******************************************************************************
23678  131060                          TS654:
23679  131060  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
23680  131066  001403                          BEQ     70$             ;IF NO THEN DO TEST
23681  131070  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
23682  131074  001036                          BNE     TS655           ;IF NO THEN SHIP TO NEXT TEST
23683  131076                          70$:
23684  131076  106427  000340                  MTPS    #340            ;SET PSW TO PRIORITY 7
23685  131102  017703  175632                  MOV     @RVECT2,R3      ;SAVE RECEIVE VECTOR
23686  131106  012777  131164  175624          MOV     #2$,@RVECT2     ;POINT RCV VECTOR TO ERROR REPORT
23687  131114  052777  000100  175606          BIS     #BIT6,@RCSR2    ;SET RCV INTERRUPT ENABLE
23688  131122  012777  000377  175606          MOV     #377,@TBUF2     ;SEND AN ALL 1'S CHARACTER
23689  131130  105777  175574          1$:     TSTB    @RCSR2          ;WAIT FOR RCV DONE
23690  131134  100375                          BPL     1$
23691  131136  000005                          RESET                   ;CLEAR RCV INTERRUPT & RBUF2
23692  131140  052777  000100  175562          BIS     #BIT6,@RCSR2    ;SET RECEIVER INTERRUPT
23693  131146  106427  000140                  MTPS    #140            ;SET PSW TO PRIORITY 3
23694  131152  000240                          NOP                     ;ALLOW TIME FOR AN ERRONEOUS INTERRUPT
```

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23695  131154  042777  000100  175546          BIC     #BIT6,@RCSR2    ;NO INTERRUPT-CLEAR INT. ENABLE
23696  131162  000401                          BR      3$
23697  131164                          2$:
23698  131164  104000                          EMT                     ;
23699  131166  010377  175546          3$:     MOV     R3,@RVECT2      ;RESTORE RECEIVE VECTOR
23700
23701
23702                                  ;*********************************************************************************
23703                                  ;TEST 655       TEST THAT THE "OR" ERROR (BIT14) & "ERROR" (BIT15) CAN BE SET
23704                                  ;*********************************************************************************
23705  131172                          TS655:
23706  131172  012700  000003                  MOV     #3,R0           ;SET CHARACTER COUNT TO SEND 3 CHAR.
23707  131176  005077  175534          1$:     CLR     @TBUF2          ;LOAD TRANSMIT BUFFER
23708  131202  105777  175526          2$:     TSTB    @TCSR2          ;WAIT FOR TRANSMIT DONE
23709  131206  100375                          BPL     2$
23710  131210  005300                          DEC     R0              ;DECREMENT CHARACTER COUNT
23711  131212  001371                          BNE     1$              ;BR IF ALL CHARACTERS NOT TRANSMITTED
23712  131214  032777  040000  175510          BIT     #BIT14,@RBUF2   ;TEST FOR "OR" ERROR FLAG
23713  131222  001001                          BNE     3$
23714  131224  104000                          EMT                     ;
23715  131226  032777  100000  175476  3$:     BIT     #BIT15,@RBUF2   ;TEST "ERROR" FLAG
23716  131234  001001                          BNE     4$
23717  131236  104000                          EMT                     ;
23718  131240  005000                  4$:     CLR     R0              ;CLEAR LOOP COUNTER
23719  131242  005200                  5$:     INC     R0              ;INCREMENT LOOP COUNTER
23720  131244  001376                          BNE     5$              ;  UNTIL COUNTER = 0
23721  131246  005777  175460                  TST     @RBUF2          ;CLEAR CHARACTER FROM RECEIVER BUFFER
23722
23723
23724                                  ;*********************************************************************************
23725                                  ;TEST 656       TEST THAT BREAK TRANSMITS ALL ZEROES
23726                                  ;*********************************************************************************
23727  131252                          TS656:
23728  131252  032737  000001  001020          BIT     #1, @#SENV      ;ARE WE RUNNING UNDER APT
23729  131260  001403                          BEQ     70$             ;IF NO THEN DO TEST
23730  131262  005737  001006                  TST     @#SPASS         ;IS THIS FIRST PASS
23731  131266  001027                          BNE     TS657           ;IF NO THEN SHIP TO NEXT TEST
23732  131270                          70$:
23733  131270  012777  177777  175440          MOV     #-1,@TBUF2      ;TRANSMIT ALL ONES TO RCVR
23734  131276  105777  175426          1$:     TSTB    @RCSR2          ;WAIT FOR RCVR DONE
23735  131302  100375                          BPL     1$
23736  131304  005777  175422                  TST     @RBUF2          ;CLEAR DONE (LEAVING ALL ONES IN RBUF)
23737  131310  052777  000001  175416          BIS     #BIT0,@TCSR2    ;TRANSMIT BREAK
23738  131316  005000                          CLR     R0              ;CLEAR A TIMER
23739  131320  105777  175404          2$:     TSTB    @RCSR2          ;WAIT FOR RCVR DONE
23740  131324  100403                          BMI     CONT42          ;BR IF DONE
23741  131326  005200                          INC     R0              ;IF NOT, INCREMENT TIMER
23742  131330  001373                          BNE     2$
23743  131332  104000                          EMT                     ;BREAK DID NOT TRANSMIT ANYTHING
23744
23745  131334  105777  175372          CONT42: TSTB    @RBUF2          ;CHECK RECEIVE BUFFER FOR ZERO
23746  131340  001401                          BEQ     3$
23747  131342  104000                          EMT                     ;BREAK DID NOT TRANSMIT ALL ZEROES
23748
23749  131344  000005                  3$:     RESET                   ;CLEAR ERRORS
23750
```

```
23751
23752                                   ;*****************************************************************************
23753                                   ;TEST 657       TEST THAT "FR" ERROR CAN BE SET DURING BREAK
23754                                   ;*****************************************************************************
23755  131346                           TS657:
23756  131346  052777  000001  175360          BIS     #BIT0,@TCSR2    ;SEND BREAK
23757  131354  005077  175356                CLR     @TBUF2          ;TRANSMIT A CHARACTER TO TIME BREAK
23758  131360  105777  175344          1$:   TSTB    @RCSR2          ;WAIT FOR RCVR DONE
23759  131364  100375                        BPL     1$
23760  131366  042777  000001  175340      BIC     #BIT0,@TCSR2    ;CLEAR BREAK BITS
23761  131374  032777  020000  175330      BIT     #BIT13,@RBUF2   ;CHECK FOR FRAMING ERROR FLAG
23762  131402  001001                        BNE     2$
23763  131404  104000                        EMT                     ;BREAK DID NOT SET FRAMING ERROR
23764  131406  032777  100000  175316  2$:   BIT     #BIT15,@RBUF2   ;TEST 'ERROR' FLAG
23765  131414  001001                        BNE     3$
23766  131416  104000                        EMT                     ;"ERROR" FLAG DID NOT SET WITH "DR" FLAG
23767  131420  005777  175306          3$:   TST     @RBUF2          ;CLEAR RECEIVER BUFFER
23768
23769                                   ;*****************************************************************************
23770                                   ;TEST 660       TEST DATA PATHS USING WRAP CABLE
23771                                   ;*****************************************************************************
23772  131424                           TS660:
23773  131424  005001                        CLR     R1              ;CLEAR REGISTER FOR TEST DATA
23774  131426  105201                  1$:   INCB    R1              ;INCREMENT THE TEST DATA
23775  131430  010177  175302                MOV     R1,@TBUF2       ;XMIT A CHARACTER
23776  131434  005000                        CLR     R0              ;CLEAR A TIMER
23777  131436  105777  175266          2$:   TSTB    @RCSR2          ;WAIT FOR RECEIVER DONE
23778  131442  100403                        BMI     3$              ;BR IF DONE
23779  131444  005200                        INC     R0              ;INCREMENT TIMER IF NOT
23780  131446  001373                        BNE     2$
23781  131450  104000                        EMT                     ;
23782  131452  017702  175254          3$:   MOV     @RBUF2,R2       ;GET RECEIVED CHARACTER
23783  131456  020102                        CMP     R1,R2           ;COMPARE DATA
23784  131460  001401                        BEQ     4$
23785  131462  104000                        EMT                     ;
23786  131464  105701                  4$:   TSTB    R1              ;TEST XMIT DATA FOR ZERO
23787  131466  001357                        BNE     1$              ;BR, IF NOT FINISHED
23788  131470  000167  000114                JMP     UNIQUE          ;FINISHED TESTING DEVICES SEPARATELY
23789                                                                 ;GO TEST THEM ALL TOGETHER
23790  131474  000000                  $BDADR: 0
23791  131476  000000                  $BDDAT: 0
23792  131500  000000                  $GDADR: 0
23793  131502  000000                  $GDDAT: 0
23794
23795
23796  131504  012737  000006  001002  ERROR7: MOV     #6,@#$FATAL                     ;SET UP FATAL ERROR NUMBER
23797  131512  012767  000001  047260          MOV     #1,$MSGTY                       ;SET FATAL ERROR FLAG
23798  131520  032737  000001  001020          BIT     #1,@#$ENV                       ;UNDER APT ?
23799  131526  001004                        BNE     SL2HLT                          ;YES
23800  131530  012700  131542                MOV     #SL2MSG,R0
23801  131534  004767  001570                JSR     PC,TYPE
23802  131540  000777                  SL2HLT: BR      .
23803
23804  131542  040506  046111  051125  SL2MSG: .ASCIZ  /FAILURE DURING SLU 2 TEST/<12><15>
23805  131550  020105  052504  044522
23806  131556  043516  051440  052514
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23807  131564  031040  052040  051505
23808  131572  005124  000015
23809                                  .EVEN
23810
23811
23812  131576  177560                  DADTBL: .WORD   177560
23813  131600  177564                          .WORD   177564
23814  131602  176500                          .WORD   176500
23815  131604  176504                          .WORD   176504
23816  131606  177564                  TBLEND: .WORD   177564
23817
23818
23819  131610  032777  000034  067566  UNIQUE: BIT     #34,@SWR
23820  131616  001402                          BEQ     1$
23821  131620  000167  001320                  JMP     ENDPAS
23822  131624  012737  000007  001004  1$:     MOV     #7,@#$TESTN     ;UPDATE TEST NUMBER FOR APT
23823  131632  012737  132450  000030          MOV     #ERROR8,@#30    ;SET UP FOR CORRECT ERROR CALL
23824
23825                                  ;*****************************************************************************
23826                                  ;TEST 661       UNIQUE INTERNAL ADDRESS TEST
23827                                  ;*****************************************************************************
23828  131640                          TS661:
23829  131640  032737  000001  001020          BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
23830  131646  001403                          BEQ     70$             ;IF NO THEN DO TEST
23831  131650  005737  001006                  TST     @#$PASS         ;IS THIS FIRST PASS
23832  131654  001044                          BNE     TS662           ;IF NO THEN SHIP TO NEXT TEST
23833  131656                          70$:
23834  131656  012767  000340  046112          MOV     #340,PS         ;WE WILL BE PLAYING WITH BIT6
23835                                                                  ;SO LOCK OUT EXTRANEOUS INTERRUPTS
23836  131664  012700  131576                  MOV     #DADTBL,R0      ;GET LOCATION OF FIRST REGISTER ADDRESS
23837  131670  012703  131576          1$:     MOV     #DADTBL,R3      ;MAKE R3 POINT TO LOCATION OF FIRST
23838                                                                  ;REGISTER ADDRESS
23839  131674  012701  000005                  MOV     #5,R1           ;SET LOOP COUNTER TO CLEAR ALL REG.
23840  131700  005033                  2$:     CLR     @(R3)+          ;CLEAR A REGISTER
23841  131702  077102                          SOB     R1,2$           ;LOOP UNTIL ALL REGISTERS CLEARED
23842  131704  012770  000100  000000          MOV     #BIT6,@(R0)     ;SET TEST BIT IN DEVICE REGISTERS
23843  131712  012701  131576                  MOV     #DADTBL,R1      ;GET LOCATION OF FIRST REGISTER ADDRESS
23844  131716  012702  000005                  MOV     #5,R2           ;SET UP TEST LOOP COUNTER
23845  131722  032731  000100          3$:     BIT     #BIT6,@(R1)+    ;IS TEST BIT SET IN THIS REGISTER
23846  131726  001006                          BNE     5$              ;IF YES GO SEE IF THERE IS AN ERROR
23847  131730  077204                  4$:     SOB     R2,3$           ;LOOP UNTIL ALL REGISTER CHECKED
23848  131732  005030                          CLR     @(R0)+          ;CLEAR REGISTER JUST TESTED AND POINT
23849                                                                  ;TO NEXT ONE
23850  131734  020027  131606                  CMP     R0,#TBLEND              ;ARE WE DONE TESTING
23851  131740  001407                          BEQ     7$              ;IF YES GO TO NEXT TEST
23852  131742  000752                          BR      1$              ;CONTINUE TESTING
23853  131744  021041                  5$:     CMP     (R0),-(R1)      ;DID WE COMPARE THE REGISTER TO ITSELF?
23854  131746  001401                          BEQ     6$
23855  131750  104000                          EMT                     ;WRITE TO 1 INTERNAL ADDRESS MODIFIED
23856                                                                  ;ANOTHER SO ADDRESS NOT UNIQUE
23857  131752  062701  000002          6$:     ADD     #2,R1           ;RESTORE POINTER
23858  131756  000764                          BR      4$              ;GET BACK IN TEST LOOP
23859  131760  005000                  7$:     CLR     R0              ;INITIALIZE LOOP COUNTER
23860  131762  005200                  8$:     INC     R0              ;INCREMEMT COUNTER
23861  131764  001376                          BNE     8$              ;  UNTIL LOOP COUNTER = 0
23862
```

```
23863
23864
23865                                   ;*****************************************************************************
23866                                   ;TEST 662       TEST ALL INTERNAL OPTIONS SIMULTANEOUSLY
23867                                   ;*****************************************************************************
23868  131766                           TS662:
23869  131766  032737  000001  001020           BIT     #1, @#$ENV      ;ARE WE RUNNING UNDER APT
23870  131774  001405                           BEQ     70$             ;IF NO DO TEST
23871  131776  005737  001006                   TST     @#$PASS         ;IS THIS FIRST PASS
23872  132002  001402                           BEQ     70$             ;IF YES DO TEST
23873  132004  000167  001134                   JMP     ENDPAS          ;IF NO THEN SKIP THIS TEST
23874  132010  000005                   70$:    RESET                   ;CLEAR EVERY BODY
23875  132012  012767  000340  045756           MOV     #340,PS         ;SET PROCESSOR PRIORITY TO 7
23876  132020  017767  174720  105332           MOV     @TVECT2,$TMP0
23877  132026  017767  174706  105326           MOV     @RVECT2,$TMP1
23878  132034  017767  172604  105322           MOV     @TVECT,$TMP2
23879  132042  017767  172572  105316           MOV     @RVECT,$TMP3
23880  132050  017767  172576  105312           MOV     @RTCVT,$TMP4
23881  132056  005067  000360                   CLR     XMTCT2
23882  132062  005067  000356                   CLR     RECCT2
23883  132066  005067  000354                   CLR     TICKS
23884  132072  012777  132210  174644           MOV     #XMIT2, @TVECT2 ;SET UP SLU2 TRANSMIT VECTOR
23885  132100  012777  000340  174640           MOV     #340, @TPSW2    ;AND PSW
23886  132106  012777  132244  174624           MOV     #REC2, @RVECT2  ;SET UP SLU2 RECEIVER VECTOR
23887  132114  012777  000340  174620           MOV     #340, @RPSW2    ;AND PSW
23888  132122  012777  132200  172522           MOV     #TICKER, @RTCVT ;SET UP RTC VECTOR
23889  132130  012777  000340  172516           MOV     #340, @RTCPSW   ;AND PSW
23890  132136  052777  000100  174570           BIS     #BIT6, @TCSR2   ;ENABLE SLU2 XMIT INTERRUPT
23891  132144  052777  000100  174556           BIS     #BIT6, @RCSR2   ;ENABLE SLU2 RECEIVER INTERRUPT
23892  132152  012703  132544                   MOV     #BUF2, R3       ;SET UP RECEIVER BUFFER
23893  132156  052777  000100  172464           BIS     #BIT6, @LKS     ;ENABLE RTC INTERRUPTS
23894  132164  012701  177777           3$:     MOV     #-1, R1         ;INITIALIZE DATA FOR SLU2
23895  132170  005067  045602                   CLR     PS              ;DROP PROCESSOR PRIORITY TO 0
23896  132174  000001                   WAITIO: WAIT                    ;WAIT FOR INTERRUPT
23897  132176  000776                           BR      WAITIO
23898
23899  132200  005267  000242           TICKER: INC     TICKS           ;UPDATE COUNT
23900  132204  000167  000056                   JMP     IOHAND          ;GO TO INTERRUPT HANDLER
23901
23902  132210  005267  000226           XMIT2:  INC     XMTCT2          ;UPDATE XMIT INTERRUPT COUNT
23903  132214  005201                           INC     R1              ;UPDATE XMIT DATA
23904  132216  010177  174514                   MOV     R1, @TBUF2      ;SEND NEXT CHARACTER
23905  132222  026727  000214  000400           CMP     XMTCT2, #400    ;IF 256 CHARACTERS HAVE NOT
23906  132230  002403                           BLT     1$              ;BEEN TRANSFERRED CONTINUE
23907  132232  042777  000100  174474           BIC     #BIT6, @TCSR2   ;ELSE NO MORE XMIT INTERRUPTS
23908  132240  000167  000022           1$:     JMP     IOHAND          ;GO TO INTERRUPT HANDLER
23909
23910  132244  005267  000174           REC2:   INC     RECCT2          ;UPDATE RECEIVER INTERRUPT COUNT
23911  132250  005777  174456                   TST     @RBUF2          ;BIT 15 SETS IF ANY ERRORS OCCURRED
23912  132254  100002                           BPL     3$              ;IF BIT IS CLEAR NO ERRORS
23913  132256  000005                           RESET                   ;CLEAR THE WORLD - STOP ALL
23914                                                                   ;INTERRUPTS
23915  132260  104000                           EMT                     ;RECEIVER STATUS ERROR
23916  132262  117723  174444           3$:     MOVB    @RBUF2, (R3)+   ;GET DATA AND STORE IT
23917
23918  132266  026727  000154  000074   IOHAND: CMP     TICKS, #74      ;HAS 1 SEC ELAPSED
```

```
23919  132274  001401                        BEQ     1$              ;IF YES STOP TEST
23920  132276  000002                        RTI                     ;RETURN FROM INTERRUPT TO AWAIT NEXT
23921  132300  042777  000100  172326  1$:   BIC     #BIT6,@TCSR     ;IF YES STOP TRANSMISSIONS
23922  132306  042777  000100  174420        BIC     #BIT6,@TCSR2    ;
23923  132314  042777  000100  172326        BIC     #BIT6, @LKS     ;TURN OFF LINE CLOCK
23924
23925  132322  106427  000000        WAITER: MTPS    #0              ;LOWER PRIORITY TO ALLOW TIME FOR RECEIVER TO FINISH
23926  132326  012705  140000                MOV     #-40000,R5      ;SET UP LOOP COUNTER
23927  132332  062705  000001        1$:     ADD     #1, R5          ;DO LOOP UNTIL R5 = 0
23928  132336  001375                        BNE     1$
23929  132340  000005                        RESET                   ;STOP EVERYONE SHOULD BE DONE
23930
23931
23932  132342  026767  000074  000074  CHECK2: CMP     XMTCT2, RECCT2  ;#OF XMIT INTERRUPTS = REC INTERRUPTS
23933  132350  001401                        BEQ     1$
23934  132352  104000                        EMT                     ;INTERRUPT COMPARISON ERROR
23935  132354  012703  132544        1$:     MOV     #BUF2, R3       ;INITIALIZE TO FIRST RECEIVED DATA
23936  132360  005001                        CLR     R1              ;INITIALIZE TO FIRST XMIT DATA
23937  132362  016704  000054                MOV     XMTCT2, R4      ;GET # OF BYTES TRANSFERRED
23938  132366  122301                2$:     CMPB    (R3)+, R1       ;IS RECEIVED DATA = EXPECTED DATA
23939  132370  001401                        BEQ     3$
23940  132372  104000                        EMT                     ;SLU2 DATA COMPARISON ERROR
23941  132374  005201                3$:     INC     R1              ;UPDATE TO NEXT GOOD DATA
23942  132376  077405                        SOB     R4,2$           ;LOOP UNTIL ALL DATA CHECKED
23943  132400  016777  104754  174336  FINIE:  MOV     $TMP0, @TVECT2  ;RESTORE VECTORS
23944  132406  016777  104750  174324        MOV     $TMP1, @RVECT2
23945  132414  016777  104744  172222        MOV     $TMP2, @TVECT
23946  132422  016777  104740  172210        MOV     $TMP3, @RVECT
23947  132430  016777  104734  172214        MOV     $TMP4, @RTCVT
23948  132436  000167  000502                JMP     ENDPAS          ;FINISHED TESTING GO TO END OF PASS
23949
23950  132442  000000                XMTCT2: .WORD   0
23951  132444  000000                RECCT2: .WORD   0
23952  132446  000000                TICKS:  .WORD   0
23953
23954  132450  012737  000007  001002  ERROR8: MOV     #7,@#$FATAL             ;SET UP FATAL ERROR NUMBER
23955  132456  012767  000001  046314          MOV     #1,$MSGTY               ;SET FATAL ERROR FLAG
23956  132464  032737  000001  001020          BIT     #1,@#$ENV               ;UNDER APT ?
23957  132472  001004                          BNE     COMHLT                  ;YES
23958  132474  012700  132506                  MOV     #COMMSG,R0
23959  132500  004767  000624                  JSR     PC,TYPE
23960  132504  000777                COMHLT: BR      .
23961
23962  132506  040506  046111  051125  COMMSG: .ASCIZ  /FAILURE DURING COMMON TEST/<12><15>
23963  132514  020105  052504  044522
23964  132522  043516  041440  046517
23965  132530  047515  020116  042524
23966  132536  052123  006412     000
23967          132544                .EVEN
23968
23969  132544  000200                BUF2:   .BLKW   200
23970
23971
23972
23973
23974  133144  005327                ENDPAS: DEC     (PC)+           ;DECREMENT TEST LOOP COUNTER
```

```
 23975  133146  000001                  $EOPCT: .WORD   1
 23976  133150  003043                          BGT     $DOAGN          ;IF COUNTER NOT 0 DO TEST AGAIN
 23977  133152  005267  045630                  INC     $PASS           ;INCREMENT PASS COUNTER
 23978  133156  042767  100000  045622          BIC     #100000,$PASS   ;DON'T LET IT BE NEGATIVE
 23979  133164  016767  045634  177754          MOV     $USWR,$EOPCT    ;RESET TEST LOOP COUNTER
 23980  133172  012700  133403                  MOV     #ENDMSG,R0      ;LET R0 POINT TO ENDPASS MESSAGE
 23981  133176  004767  000126                  JSR     PC,TYPE         ;GO TYPE END PASS MESSAGE
 23982  133202  016700  044634                  MOV     42,R0           ;GET MONITOR ADDRESS
 23983  133206  001405                          BEQ     DOAGIN          ;IF = 0 NO MONITOR SO DON'T STOP
 23984  133210  000005                          RESET                   ;IF MONITOR CLEAR THE WORLD
 23985  133212  004710                  $ENDAD: JSR     PC,(R0)         ;GO TO MONITOR
 23986  133214  000240                          NOP                     ;THESE THREE LOCATIONS RESERVED
 23987  133216  000240                          NOP
 23988  133220  000240                          NOP
 23989  133222  013737  000004  037360  DOAGIN: MOV     @#4,@#$TMP0
 23990  133230  012737  133246  000004          MOV     #1$,@#4
 23991  133236  012737  000001  164000          MOV     #1,@#164000
 23992  133244  000402                          BR      2$
 23993  133246  062706  000004          1$:     ADD     #4,SP
 23994  133252  013737  037360  000004  2$:     MOV     @#$TMP0,@#4
 23995  133260  000137                  $DOAGN: JMP     @(PC)+          ;RETURN TO TEST AT LOCATION RESTRT
 23996  133262  001226                          .WORD   RESTRT
 23997
 23998
 23999
 24000                                  ;*********************************************************************************
 24001                                  ;*COMMON SUBROUTINES THAT ARE NEEDED BY THE PROGRAM
 24002                                  ;*
 24003                                  ;*********************************************************************************
 24004
 24005  133264  012737  133274  000024  PWRDN:  MOV     #PWRUP,@#24     ;SET UP POWER FAIL VECTOR FOR POWER UP
 24006  133272  000000                          HALT
 24007
 24008  133274  012737  133264  000024  PWRUP:  MOV     #PWRDN,@#24     ;SET UP POWER FAIL VECTOR FOR POWER DOWN
 24009  133302  012706  001000                  MOV     #STBOT,SP       ;SET UP STACK
 24010  133306  005737  000172                  TST     @#MTFLAG        ;ARE WE ON MULTI-OPTION TESTER
 24011  133312  001004                          BNE     1$              ;IF YES SKIP TYPE OUT
 24012  133314  012700  133364                  MOV     #PWRMSG,R0      ;POINT R0 TO POWER FAIL MESSAGE
 24013  133320  004767  000004                  JSR     PC,TYPE         ;GO TYPE IT
 24014  133324  000167  045676          1$:     JMP     RESTRT          ;GO RESTART TEST
 24015
 24016
 24017  133330  132767  000040  045463  TYPE:   BITB    #40,$ENVM       ;TYPE OUTS DISABLED
 24018  133336  001011                          BNE     3$              ;IF YES GET TO EXIT
 24019  133340  105737  177564          1$:     TSTB    @#TTCSR         ;TEST FOR PRINTER READY BIT
 24020  133344  100375                          BPL     1$              ;IF NOT READY WAIT FOR IT
 24021  133346  112037  177566                  MOVB    (R0)+,@#TPB     ;WHEN READY PRINT A CHARACTER
 24022  133352  001372                          BNE     1$              ;IF LAST CHARACTER NOT NULL CONTINUE TYPING
 24023  133354  105737  177564          2$:     TSTB    @#TTCSR         ;WAIT FOR PRINTER TO FINISH
 24024  133360  100375                          BPL     2$
 24025  133362  000207                  3$:     RTS     PC
 24026
 24027                                  ;*********************************************************************************
 24028                                  ;*MESSAGES
 24029                                  ;*
 24030                                  ;*********************************************************************************
```

```
 24031
 24032  133364  047520  042527  020122  PWRMSG: .ASCIZ  /POWER FAILED/<12><15>
 24033  133372  040506  046111  042105
 24034  133400  006412     000
 24035  133403     105  042116  047440  ENDMSG: .ASCIZ  /END OF PASS CJKDJB0/<12><15>
 24036  133410  020106  040520  051523
 24037  133416  041440  045512  045104
 24038  133424  030102  006412     000
 24039  133431     012  051415  040524  STRMSG: .ASCIZ  <12><15>/START TESTING/<12><15>
 24040  133436  052122  052040  051505
 24041  133444  044524  043516  006412
 24042  133452     000
 24043
 24044
 24045          000001                  .END
```

```
A       020450          AC1     =%000001        AMSGLG= 000000          BBBP1   074466          BDONE   055022
AAADON  074232          AC2     =%000002        AMSGTY= 000000          BBBP2   074476          BDVHLT  054472
AAA1    073432          AC3     =%000003        AMTYP1= 000000          BBB0    074236          BDVMSG  054474
AAA10   073762          AC4     =%000004        AMTYP2= 000000          BBB1    074264          BDVTST  053266
AAA11   074012          AC5     =%000005        AMTYP3= 000000          BBB2    074316          BDVTS2  054030
AAA12   074042          AC6     =%000006        AMTYP4= 000000          BBB3    074336          BELL    = 000240
AAA13   074072          AC7     =%000007        ANSR    053754          BBB4    074370          BIC1    013656
AAA2    073462          ADC1      014414        APASS = 000000          BBB5    074416          BIC2    013660
AAA3    073512          ADC2      014416        APRIOR= 000000          BBB6    074424          BIC3    013676
AAA4    073542          ADC3      014436        APTENV= 000001          BBB7    074304          BIS1    013722
AAA5    073572          ADC4      014440        AROUN   001562          BBCDON  115146          BIS2    013724
AAA6    073622          ADC5      014456        AROUND  025044          BBCTP1  115140          BIS3    013744
AAA7    073652          ADDW0 = 000000          ASLB1   015774          BBC10   115144          BITCHK  020124
AAA8    073702          ADDW1 = 000000          ASLB2   015762          BBC2    115114          BITCLR  020052
AAA9    073732          ADDW10= 000000          ASLB3   015764          BBDAT0  067274          BITCON  020200
AABBF0  110230          ADDW11= 000000          ASLB4   016006          BBDDON  124444          BITSET  020070
AABDON  110250          ADDW12= 000000          ASL1    015366          BBDONE  067424          BITST1  013612
AABTP1  110240          ADDW13= 000000          ASL2    015370          BBD1    124224          BITST2  013614
AAB2    110226          ADDW14= 000000          ASL3    015406          BBPAT0  067304          BITST3  013632
AACDON  115072          ADDW15= 000000          ASL4    015410          BBPAT1  067314          BIT0    = 000001
AACTP1  115064          ADDW2 = 000000          ASL5    015424          BBPAT2  067324          BIT1    = 000002
AAC10   115070          ADDW3 = 000000          ASL6    015426          BBPAT3  067334          BIT10   = 002000
AAC2    115040          ADDW4 = 000000          ASL7    015452          BBPAT4  067344          BIT11   = 004000
AADAT0  065714          ADDW5 = 000000          ASRB1   016032          BBPAT5  067354          BIT12   = 010000
AADBF   124210          ADDW6 = 000000          ASRB2   016044          BBPAT6  067364          BIT13   = 020000
AADDON  124214          ADDW7 = 000000          ASRB3   016046          BBP10   067404          BIT14   = 040000
AADONE  066014          ADDW8 = 000000          ASRB4   016054          BBP11   067414          BIT15   = 100000
AAD1    124134          ADDW9 = 000000          ASRB5   016056          BBP7    067 4           BIT2    = 000004
AAPAT0  065724          ADD1      014276        ASRB6   016076          BB10    066752          BIT3    = 000010
AAPAT1  065734          ADD2      014300        ASRB7   016100          BB13    066760          BIT4    = 000020
AAPAT2  065744          ADD3      014314        ASR1    015476          BB14    066770          BIT5    = 000040
AAPAT3  065754          ADD4      014316        ASR2    015500          BB15    067010          BIT6    = 000100
AAPAT4  065764          ADD5      014334        ASR3    015522          BB16    067034          BIT7    = 000200
AAPAT5  065774          ADD6      014336        ASR4    015524          BB17    067042          BIT8    = 000400
AAPAT6  066004          ADD7      014350        ASR5    015540          BB2     066650          BIT9    = 001000
AA11    065604          ADD8      014352        ASR6    015542          BB20    067052          BRCT      001606
AA12    065606          ADD9      014372        ASR7    015572          BB21    067072          BRH       001572
AA13    065624          ADEVCT= 000000          ASTART  025534          BB22    067116          BRTAB     021242
AA2     065534          ADEVM = 000000          ASWREG= 000000          BB25    067124          BR1       021442
AA20    065632          ADONE   054766          ATESTN= 000000          BB26    067134          BR10      021604
AA22    065656          AENV  = 000000          ATRAP   023460          BB27    067154          BR11      021664
AA23    065660          AENVM = 000000          AUNIT = 000000          BB3     066654          BR12      021724
AA24    065700          AERR1   054756          AUSWR = 000000          BB30    067176          BR13      021764
AA27    065706          AFATAL= 000000          AUTO1   023552          BB31    067204          BR14      022024
AA3     065536          AMADR1= 000000          AVECT1= 000000          BB32    067214          BR15      022076
AA4     065554          AMADR2= 000000          AVECT2= 000000          BB33    067234          BR16      022110
AA7     065562          AMADR3= 000000          A1      054726          BB34    067256          BR17      022122
ABASE = 000000          AMADR4= 000000          A11     054726          BB35    067264          BR2       021462
ACDW1 = 000000          AMAMS1= 000000          A12     054742          BB4     06 672          BR20      022134
ACDW2 = 000000          AMAMS2= 000000          A2      054760          BB5     066700          BR21      022146
ACPUOP= 000000          AMAMS3= 000000          BA      051536          BB6     066710          BR22      022160
ACTSUM  053762          AMAMS4= 000000          BBBDON  074506          BB7     066730          BR23      022172
AC0     =%000000        AMSGAD= 000000          BBBER1  074302          BCF     053750          BR3       021476
```

BR4	021514	CCX20	066262	CPUHLT	002164	DDD7	075544	DIVDT	075722
BR5	021532	CCX21	066306	CPUMSG	002166	DDONE	055420	DIVFSU	075122
BR6	021550	CCX24	066314	CSRMSG	051451	DDP0	070204	DIVFT	075230
BR7	021566	CCX25	066324	CSR1	051532	DDP1	070214	DLOOP	054072
BR70	023300	CCX26	066344	CSR2	051534	DDP2	070224	DI11W	023620
BR71	024014	CCX27	066366	CTRAP	023476	DDP3	070234	DNMB0A	007472
BTCON	020236	CCX3	066062	C15	055032	DDP4	070244	DNMB0B	007474
BTERR	020230	CCX30	066374	C2	055046	DDP5	070254	DNMB2A	007626
BTRAP	023526	CCX31	066404	C25	055054	DDP6	070264	DNMB2B	007630
BUF2	132544	CCX32	066424	C3	055072	DDP7	070274	DNMB2C	007636
B1	054776	CCX33	066446	C35	055100	DDP8	070304	DNMB2D	007652
B2	055000	CCX36	066454	C4	055116	DDP9	070314	DNMB2E	007654
B3	055020	CCX6	066070	C45	055122	DD10	067556	DNMB2F	007664
CARRY1	003266	CCX7	066100	C5	055140	DD11	067564	DNMB3A	007730
CC =	177776	CCX8	066120	C55	055144	DD12	067600	DNMB3B	007732
CCBDON	110310	CCX9	066142	C6	055160	DD13	067620	DNMB3C	007742
CCB10	110306	CC1	001566	C65	055166	DD14	067642	DNMB3D	007760
CCB2	110262	CC2	020332	C7	055204	DD15	067650	DNMB3E	007762
CCCDON	075240	CC3	020316	C75	055212	DD16	067664	DNMB4A	010102
CCC1	074512	CDONE	055252	C8	055230	DD17	067704	DNMB4B	010104
CCC10	074776	CHECK2	132342	C85	055234	DD18	067726	DNMB4C	010114
CCC11	075022	CHKAPT	050410	DADTBL	131576	DD2	067450	DNMB4D	010124
CCC12	075046	CHKSUM	053764	DAERR	020176	DD21	067734	DNMB4E	010126
CCC13	075072	CHKWRD	054412	DALTB1	044126	DD22	067744	DNMB4F	010134
CCC2	074536	CIS	025332	DALTB2	044162	DD23	067764	DNM03A	007072
CCC3	074562	CISADR	025036	DALTB3	044412	DD24	070006	DNM03B	007074
CCC4	074606	CISTRP	025022	DALTB4	044446	DD27	070014	DNM03C	007104
CCC5	074632	CLRCD	020314	DATA	051542	DD3	067472	DNM1	007004
CCC6	074656	CLR1	014152	DBE	024644	DD30	070024	DNM1A	007524
CCC7	074702	CMPREG	050226	DBE1	024652	DD31	070044	DNM1B	007526
CCC8	074726	CMPSUB	074126	DBE2	024650	DD32	070066	DNM2	007012
CCC9	074752	CMPTMP	074222	DBE3	024664	DD35	070074	DNM2A	007556
CCDATO	066464	CMP1	014574	DBE4	024676	DD36	070110	DNM2B	007560
CCERR	020422	CMP2	014576	DBE5	024706	DD37	070130	DNM2C	007566
CCP0	066474	CMP3	014620	DDBBF0	110474	DD38	070152	DNM2D	007570
CCP1	066504	CMP4	014622	DDBDON	110504	DD41	070160	DNM3	007022
CCP10	066574	CMP5	014646	DDBTP1	110454	DD6	067500	DNM4	007036
CCP11	066604	CMP6	014650	DDBTP2	110464	DD7	067514	DNM4A	010026
CCP12	066614	CMP7	014670	DDB2	110410	DD8	067534	DNM4B	010030
CCP2	066514	CNTR	050534	DDB5	110452	DEC1	014052	DNM4C	010036
CCP3	066524	COMHLT	132504	DDCDON	115246	DEC2	014054	DNM5A	010176
CCP4	066534	COMMSG	132506	DDCTP1	115232	DEC3	014070	DNM5B	010200
CCP5	066544	COMPLE	054406	DDC10	115244	DEC4	014072	DNM5C	010210
CCP6	066554	COM1	014712	DDC2	115200	DEC5	014106	DNM6A	010252
CCP7	066564	CONCIS	025076	DDDATO	070174	DEC6	014110	DNM6B	010254
CCXDON	066624	CONT	001610	DDDDON	075732	DEC7	014132	DNM6C	010264
CCX12	066150	CONTIN	001220	DDDONE	070324	DERR1	055354	DNM7A	010330
CCX13	066160	CONT42	131334	DDD1	075244	DERR2	055322	DNM7B	010332
CCX14	066200	CON1	020340	DDD2	075304	DEVADR	051530	DNM7C	010342
CCX15	066224	CON2	020424	DDD3	075344	DEVECT	051524	DOAGIN	133222
CCX18	066232	CORH	023520	DDD4	075404	DEV1	051526	DOPB2A	007312
CCX19	066242	COUNT	025412	DDD5	075444	DISPRE	000174	DOPB2B	007344
CCX2	066040	COUNTR	053752	DDD6	075504	DIVDSU	075610	DOP0A	006640

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DOP0B   006656      EEP3    070542      ESR29   052310      FDAT00  055764      FXDAT4  056016
DOP0C   006670      EEP4    070552      ESR3    050576      FDAT01  055766      FXDAT5  056020
DOP0D   006712      EERR0   055464      ESR30   052346      FDAT02  055770      FXDAT6  056022
DOP03A  006752      EE12    070464      ESR31   052344      FDAT03  055772      FXDAT7  056024
DOP03B  006754      EE2     070350      ESR32   052566      FDAT04  055774      F10     055654
DOP1    007212      EE3     070372      ESR33   052404      FDAT05  055776      F11     055656
DOP2    007262      EE6     070400      ESR34   051374      FDAT06  056000      F12     055672
DOP4    011324      EE7     070414      ESR35   052460      FDAT07  056002      F13     055716
DOP5    011372      EE8     070434      ESR36   126260      FDONE   056026      F135    055702
DPAT3   062146      EE9     070456      ESR37   126276      FERR20  055740      F14     055724
DRLP    054410      EISEND  037340      ESR38   126314      FFBBF1  110756      F2      055514
DTRAP1  023516      EMTA    = 104377    ESR39   126310      FFBDON  110770      F22     055726
DUMMY = 000000      ENDMSG  133403      ESR4    051062      FFBTP1  110746      F3      055534
D1      055276      ENDPAS  133144      ESR40   053370      FFB10   110766      F4      055536
D2      055310      ENT176  031222      ESR41   053412      FFB2    110706      F5      055552
D3      055312      ENT51   027146      ESR42   053434      FFCDON  115454      F6      055620
D4      055316      ER      001604      ESR43   053454      FFCTP1  115432      F7      055634
D5      055324      ERRORA  051332      ESR44   053474      FFCTP2  115442      GAND0   060414
D6      055340      ERRORB  053160      ESR45   053516      FFC10   115452      GAND1   060416
D7      055350      ERRORC  054436      ESR46   053536      FFC2    115406      GAND2   060420
D8      055404      ERRORD  054532      ESR47   053556      FFDAT0  070726      GAND3   060422
D9      055416      ERRORE  051520      ESR48   053604      FFDONE  071006      GCMP    060344
EDONE   055466      ERROR1  002130      ESR49   053616      FFFDON  077016      GDAT00  060434
EEBBF0  110620      ERROR2  002466      ESR5    051064      FFF1    076470      GDAT01  060436
EEBBF1  110630      ERROR3  050434      ESR50   053646      FFF2    076530      GDAT02  060440
EEBDON  110642      ERROR4  124476      ESR51   126274      FFF3    076570      GDAT03  060442
EEBTP1  110610      ERROR5  125720      ESR52   126326      FFF4    076630      GDONE   060444
EEB10   110640      ERROR6  126640      ESR53   126340      FFP0    070736      GFLAG1  060370
EEB2    110550      ERROR7  131504      ESR54   126362      FFP1    070746      GFLAG2  060372
EECDON  115354      ERROR8  132450      ESR55   126366      FFP2    070756      GGBBF0  111104
EECTP1  115330      ERRVEC= 000004      ESR57   051122      FFP3    070766      GGBBF1  111114
EECTP2  115340      ESR0    050714      ESR6    051176      FFP4    070776      GGBDON  111126
EEC10   115352      ESR1    050656      ESR7    051200      FF10    070716      GGBTP1  111074
EEC2    115276      ESR10   053342      ESR8    051254      FF2     070606      GGB10   111124
EEDAT0  070500      ESR11   051640      ESR9    051234      FF3     070630      GGB2    111034
EEDONE  070562      ESR12   052674      ESR98   052034      FF4     070636      GGCDON  115550
EEEDON  076464      ESR13   052706      ESR99   052006      FF5     070646      GGCTP1  115534
EEE1    075736      ESR14   052710      EXADHT  051404      FF6     070666      GGC10   115546
EEE10   076222      ESR15   053046      EXATST  050540      FF7     070710      GGC2    115502
EEE11   076246      ESR16   053124      EXPSUM  053760      FINIE   132400      GGDAT0  072444
EEE12   076272      ESR17   053026      EXTMSG  051406      FINISH  025376      GGDONE  072564
EEE13   076316      ESR18   053102      E1      055432      FIRST =%000005      GGER0   071712
EEE2    075762      ESR19   051264      E3      055440      FOVER   022720      GGER14  072350
EEE3    076006      ESR2    050726      E4      055442      FPEXIT  124472      GGGDON  101602
EEE4    076032      ESR20   052606      F       = 000063    FPHLT   124532      GGG1    100652
EEE5    076056      ESR21   052114      FDATI0  055742      FPMSG   124534      GGG10   101202
EEE6    076102      ESR22   052150      FDATI1  055744      FPP     025366      GGG11   101232
EEE7    076126      ESR23   052152      FDATI2  055746      FPSTRT  054642      GGG12   101262
EEE8    076152      ESR24   052214      FDATI3  055750      FPVECT= 000244      GGG13   101312
EEE9    076176      ESR25   052546      FDATI4  055752      FXDAT0  056006      GGG14   101342
EEP0    070510      ESR26   052534      FDATI5  055754      FXDAT1  056010      GGG2    100702
EEP1    070522      ESR27   052250      FDATI6  055756      FXDAT2  056012      GGG3    100732
EEP2    070532      ESR28   052252      FDATI7  055760      FXDAT3  056014      GGG4    100762
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GGG5	101012	GPAT12	060410	HCLR1	061130	HH12	071176	HX4	072642		
GGG6	101042	GPAT13	060412	HCMP	061064	HH13	071220	HX7	072650		
GGG7	101072	GRESET	060324	HCMP1	061104	HH16	071226	HX8	072664		
GGG8	101122	GSETUP	060246	HCMP2	061112	HH17	071242	HX9	072706		
GGG9	101152	GS1	060276	HDAT1	061262	HH18	071262	H1	060450		
GGP1	072454	G1	056662	HDAT2	061272	HH19	071304	H10	060712		
GGP2	072464	G10	057114	HDAT3	061302	HH2	071032	H11	060744		
GGP3	072474	G11	057116	HDAT4	061312	HH20	071312	H12	060776		
GGP4	072504	G12	057162	HDAT5	061322	HH21	071326	H2	060470		
GGP5	072514	G13	057214	HDONE	061332	HH22	071346	H3	060500		
GGP6	072524	G14	057216	HERE =	000000	HH23	071370	H4	060552		
GGP7	072534	G15	057262	HFLAG	061140	HH24	071376	H5	060574		
GGP8	072544	G16	057314	HHBBF0	111252	HH3	071054	H6	060626		
GGP9	072554	G17	057316	HHBBF1	111262	HH6	071062	H7	060660		
GG10	072006	G2	056714	HHBDON	111274	HH7	071072	IDATI0	056320		
GG11	072034	G20	057362	HHBTP1	111232	HH8	071112	IDATI1	056322		
GG12	072056	G21	057414	HHB10	111272	HH9	071134	IDATI2	056324		
GG13	072064	G22	057416	HHB2	111172	HICORE	023412	IDATI3	056326		
GG14	072100	G23	057462	HHCDON	115660	HLT =	000000	IDATO0	056310		
GG15	072126	G24	057514	HHCTP1	115636	HSTD	061006	IDATO1	056312		
GG16	072132	G25	057516	HHCTP2	115646	HXDATO	073316	IDATO2	056314		
GG17	072166	G26	057562	HHC10	115656	HXDONE	073426	IDATO3	056316		
GG18	072174	G27	057614	HHC2	115604	HXER9	073022	IDONE	056330		
GG19	072224	G3	056716	HHDATO	071412	HXP1	073326	IIBBF0	111420		
GG2	071614	G30	057616	HHDONE	071562	HXP2	073336	IIBBF1	111430		
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GG22	072302	G33	057716	HHH10	102356	HXP5	073366	IIB10	111440		
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GG25	072352	G36	060016	HHH13	102546	HXP8	073416	IIC2	115702		
GG26	072406	G37	060062	HHH2	101656	HX10	072720	IIC20	115722		
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GG3	071636	G40	060114	HHH4	101776	HX14	072750	III1	077022		
GG4	071644	G41	060116	HHH5	102046	HX15	072764	III2	077052		
GG5	071660	G42	060162	HHH6	102116	HX16	073002	III3	077102		
GG6	071706	G43	060214	HHH7	102166	HX165	073006	III4	077132		
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GG9	071756	G6	057016	HHP0	071422	HX19	073064	IJMP5	013044		
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GIN2	025152	HADR	061136	HHP10	071542	HX20	073072	ILLB =	000100		
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GPAT03	060402	HA5R	061252	HHP9	071532	HX32	073252	IPAT11	056272		
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IPAT23  056306
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I12     056134
I13     056150
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I15     056200
I16     056202
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I20     056256
I23     056264
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I4      056076
I5      056100
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JDATI2  061760
JDATI3  061762
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K7      021374
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LDAT02  062342
LDAT03  062344
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LDCFSU  116720
LDCT    117012
LDONE   062346
LDXSUB  120744
LDXT    121072
LKS     124650
LKSTST  126034
LLBBF0  112050
LLBDON  112062
LLBTP1  112040
LLB10   112060
LLB2    112004
LLCDON  117576
LLC1    117026
LLC10   117350
LLC11   117406
LLC12   117444
LLC2    117064
LLC3    117122
LLC4    117160
LLC5    117216
LLC6    117254
LLC7    117312
LLLDON  100646
LLL1    100240
LLL2    100304
LLL3    100350
LLL4    100414
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LPAT11  062304
LPAT12  062306
LPAT13  062310
LPAT20  062312
LPAT21  062314
LPAT22  062316
LPAT23  062320
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LTCMSG  126676
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L2      062214
L3      062216
L4      062220
L5      062270
L6      062276
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MBDM2C  010476
MBDM2D  010510
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MBDM2F  010522
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MBDM4C  010754
MBDM4D  010756
MBDM4E  010764
MDAT00  062474
MDAT01  062476
MDAT02  062500
MDAT03  062502
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MDM2A   010424
MDM2B   010426
MDM2C   010434
MDM2D   010436
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MDM3C   010572
MDM3D   010604
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MDM6A   011112          MMC3    117716          MRK6    016442          NEG21   005006          N1      062510
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MDM6D   011136          MMC6    120100          MTPS1   016466          NEG30   005236          N14     062602
MDM6E   011160          MMC7    120146          MTPS1A  016506          NEG31   005240          N2      062534
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MDM7B   011220          MMM1    103022          MTPS3   016602          NEG33   005264          N4      062540
MDM7C   011230          MMM2    103056          MTPS4   016644          NEG34   005272          ODATI0  063024
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MDONE   062504          MMM5    103202          MTPS7   017010          NEG41   005530          ODATI3  063032
MEM     050532          MMUHLT  050470          MULDSU  076674          NEG42   005536          ODATO0  062762
MERR3   062412          MMUMSG  050472          MULDT   077006          NEG5    014550          ODATO1  062764
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MFPS2C  017126          MODDSU  102622          M2      062376          NEG70   005700          OOBTP1  112452
MFPS3A  017166          MODDT0  102776          M3      062400          NEG71   005702          OOBTP2  112462
MFPS3B  017170          MODDT1  103006          M4      062402          NERR0   062600          OOB10   112472
MFPS3C  017202          MODFD0  103436          M5      062436          NEXT    050756          OOB2    112406
MFPS4A  017242          MODFD1  103446          M6      062442          NNBBF0  112332          OOCDON  121326
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MFPS5C  017332          MODP1   101572          NATINS  114702          NNB2    112240          OOODON  105154
MFPS6A  017374          MOR0    020456          NATSUB  114626          NNCDON  121214          OOOT    105110
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MFPS7A  017452          MOR3    020602          NDATI1  062652          NNC10   121212          OOO4    105146
MFPS7B  017454          MOR4    020614          NDATI2  062654          NNC2    121144          OPAT10  063014
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MFPT  = 000007          MOR6    020672          NDATO0  062606          NNN1    103462          OPAT12  063020
MMBBF0  112176          MOR7    020704          NDATO1  062610          NNN2    103536          OPAT13  063022
MMBBF1  112206          MOP8    020716          NDATO2  062612          NNN3    103612          OPAT20  063000
MMBDON  112220          MOV1    013546          NDATO3  062614          NNN4    103666          OPAT21  063002
MMBTP1  112156          MOV2    013550          NDONE   062660          NOCMP   054362          OPAT22  063004
MMB10   112216          MOV3    013566          NEGAT   026546          NODL    023606          OPAT23  063006
MMB2    112122          MPAT10  062454          NEG00   004650          NODL2   024234          OPAT24  063010
MMCDON  121102          MPAT11  062456          NEG01   004652          NOP   = 000240          OVDNTT  077672
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PCN2    020750
PCN3    021000
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PDATO3  063154
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PDRTB4  044462
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PPB10   112622
PPB2    112536
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REGR23  030104
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REG4A   003750
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RRBTP2  113112
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RRB10   113124
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RRC10   121704
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RRREXP  105766
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RRR3    105700
RRR4    105724
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RTCVT   124652
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RTI2    023224
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RTRAP2= 000020
RTRAP3= 000030
RTRAP4= 000014
RTRAP5= 000004
RTS1    013520
RTT1    023110
RTT2    023116
RTT3    023150
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RTT5    023122
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RVECT   124640
RVECT2  126740
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R2ERR   003626
R3ERR   003706
R4ERR   003766
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SB0      012344
SB2      012424
SB4      012506
SB5      012550
SB5A     012542
SB5X     012552
SB5XAD   012554
SB6      012604
SB6X     012606
SB7      012636
SB7X     012640
SB7XAD   012642
SCOPE =  000240
SC3      020402
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SDAT00   061630
SDAT01   061632
SDAT02   061634
SDAT03   061636
SDONE    061640
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SIXDLR   054312
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SX8      061460
SX9      061462
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S11      025456
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TRACE   023276          TST224  033116          TST41   026644          TS136   007502          TS214   014032
TRAPA = 000077          TST225  033166          TST42   026662          TS137   007534          TS215   014134
TRAPB   023554          TST226  033236          TST43   026716          TS14    003200          TS216   014154
TRAPC = 104777          TST227  033312          TST44   026750          TS140   007600          TS217   014214
TRAPPC  037346          TST230  033362          TST45   027002          TS141   007674          TS22    003412
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TRCSR = 177560          TST233  033556          TST50   027122          TS144   010144          TS222   014460
TRC1    023346          TST234  033626          TST51   027174          TS145   010222          TS223   014552
TRPADR  023430          TST235  033676          TST52   027234          TS146   010276          TS224   014672
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TR2     024016          TST240  034072          TST55   027372          TS150   010404          TS227   015134
TR3     024124          TST241  034142          TST56   027430          TS151   010446          TS23    003424
TR4     024130          TST242  034232          TST57   027466          TS152   010534          TS230   015242
TR5     024126          TST243  034302          TST60   027526          TS153   010644          TS231   015344
TSTSPC  037306          TST244  034352          TST61   027566          TS154   010706          TS232   015454
TST160  030500          TST245  034422          TST62   027624          TS155   010774          TS233   015574
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TST162  030544          TST247  034536          TS10    002734          TS157   011172          TS235   016010
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TST164  030624          TST251  034654          TS101   006020          TS160   011272          TS237   016172
TST165  030662          TST252  034724          TS102   006044          TS161   011340          TS24    003440
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TS661   131640      UIPAR0= 177640      UUB10   113552      VVVDON  106630      WWWBF0  106752
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TS7     002612      UIPAR3= 177646      UUCDON  122246      VVV2    106550      WWWTP1  106762
TS70    005414      UIPAR4= 177650      UUCTP1  122226      WAITER  132322      WWW10   107002
TS71    005450      UIPAR5= 177652      UUC2    122214      WAITI0  132174      WWW2    106714
TS72    005506      UIPAR6= 177654      UUUA1   106454      WASR6   037344      W10     064244
TS73    005544      UIPAR7= 177656      UUUA2   106456      WASSR0  037352      W11     064256
TS74    005614      UIPDR0= 177600      UUUBF0  106442      WASSR2  037354      W12     064276
TS75    005654      UIPDR1= 177602      UUUDON  106472      WATE    024440      W13     064322
TS76    005720      UIPDR2= 177604      UUUTP1  106460      WATE1   024372      W14     064330
TS77    005754      UIPDR3= 177606      UUU10   106470      WATE2   024406      W15     064342
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TTBTP1  113376      UIPDR5= 177612      UUU3    106432      WBIT   = 000100     W17     064412
TTBTP2  113406      UIPDR6= 177614      U0      063330      WC      051540      W2      064122
TTB10   113416      UIPDR7= 177616      U1      063352      WDAP00  064442      W20     064420
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TTCTB1  122152      UPAT03  064024      U14     063732      WDONE2  130330      W7      064236
TTCTB2  122162      UPAT10  064026      U15     063760      WPAT00  064432      X       124436
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XDAT02  065012          XT5     104366          YDONE   065276          Z       124442          $ENV    001020
XDAT03  065014          XT5A    104406          YFLAG   065226          ZDAT00  065450          $ENVM   001021
XDONE   065046          XT5B    104420          YNTAB   021300          ZDAT01  065452          $EOPCT  133146
XMIT2   132210          XT6     104436          YPAT00  065246          ZDAT02  065454          $ETABL  001020
XMTCT2  132442          XT6A    104462          YPAT01  065250          ZDAT03  065456          $ETEND  001030
XOR1    016226          XT6B    104474          YPAT02  065252          ZDONE   065510          $FATAL  001002
XOR2    016230          XT7     104512          YPAT03  065254          ZFLAG   065442          $GDADR  131500
XOR3    016256          XT8     104540          YPAT10  065256          ZPAT00  065460          $GDDAT  131502
XPAT0   105050          XT9     104566          YPAT11  065260          ZPAT01  065462          $HIBTS  001030
XPAT0   104760          XXBDON  113716          YPAT12  065262          ZPAT02  065464          $MAIL   001000
XPAT00  065016          XXBTP1  113674          YPAT13  065264          ZPAT03  065466          $MBADR  001032
XPAT01  065020          XXBTP2  113704          YPAT20  065266          ZPAT10  065470          $MSGAD  001014
XPAT02  065022          XXB10   113714          YPAT21  065270          ZPAT11  065472          $MSGLG  001016
XPAT03  065024          XXB2    113622          YPAT22  065272          ZPAT12  065474          $MSGTY  001000
XPAT1   104770          XXCDON  123464          YPAT23  065274          ZPAT13  065476          $PASS   001006
XPAT10  065026          XXXDON  107436          YTMP1   065230          ZPAT20  065500          $PASTM  001036
XPAT12  065032          XXX1    107010          YTMP2   065232          ZPAT21  065502          $SETUP= 000020
XPAT13  065034          XXX2    107054          YTMP3   065234          ZPAT22  065504          $STUP = 177777
XPAT2   105000          XXX3    107120          YYBDON  114070          ZPAT23  065506          $SVPC = 000400
XPAT20  065036          XXX4    107164          YYBTP1  114044          ZTMP1   065444          $SWR  = 000000
XPAT21  065040          XXX5    107230          YYBTP2  114054          ZTMP2   065446          $SWREG  001022
XPAT22  065042          X10     064616          YYBTP3  114064          ZZCBF   124116          $TESTN  001004
XPAT23  065044          X11     064632          YYB10   114066          ZZCDON  124130          $TMP0   037360
XPAT3   105010          X12     064652          YYB2    113772          ZZC10   124112          $TMP1   037362
XPA14   105020          X13     064676          YYCDON  124022          ZZC2    124034          $TMP2   037364
XPAT5   105030          X14     064704          YYC1    123470          ZZC3    124054          $TMP3   037366
XPAT6   105040          X15     064720          YYC2    123516          ZZZDON  110130          $TMP4   037370
XTDONE  105060          X16     064740          YYC3    123544          ZZZ10   110126          $TN   = 000663
XT1     104166          X17     064764          YYC4    123572          ZZZ2    110102          $TPB    025460
XT1A    104202          X2      064476          YYC5    123620          Z1      065322          $TPS    025462
XT10    104612          X20     064772          YYC6    123646          Z2      065342          $TSTM   001034
XT11    104640          X3      064522          YYYDON  110070          Z3      065366          $UNIT   001012
XT12    104666          X4      064530          YYY1    107442          Z4      065374          $UNITM  001040
XT13    104722          X5      064544          YYY2    107506          Z5      065406          $USWR   001024
XT2     104204          X6      064564          YYY3    107552          Z6      065440          $X    = 131766
XT2A    104224          X7      064610          YYY4    107616          $APTHD  001030          .     = 133453
XT2B    104242          Y       124440          YYY5    107662          $BDADR  131474          .RSET   124572
XT3     104254          YBR     001602          Y1      065100          $BDDAT  131476          .$X   = 001030
XT3A    104276          YDAT00  065236          Y2      065120          $CPUOP  001026

. ABS.  133453     000        CON    RW    REL    LCL    I

 ERRORS DETECTED:  0

 CJKDJB,CJKDJB/SOL/NL:TOC=SYSMAC.SML,CJKDJB.P11
 RUN-TIME: 65 77 3 SECONDS
 RUN-TIME RATIO: 273/145=1.8
 CORE USED:  48K  (95 PAGES)
```