PDP11/23

KEF11-AA DIAGNOSTIC #1

CJKDCA0

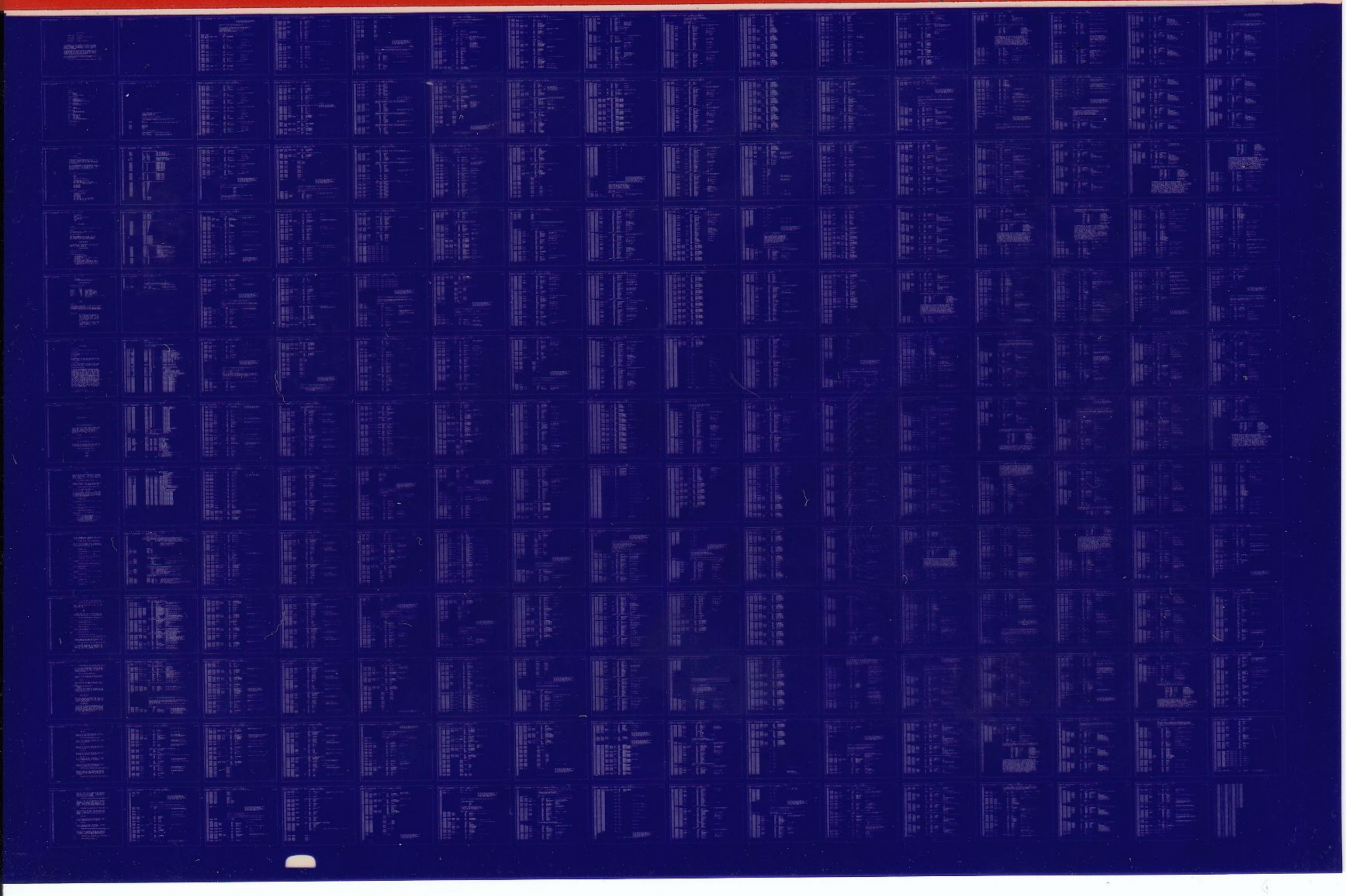
AH-F242A-MC

FICHE 1 OF 2

SEP 1979

digital

MADE IN USA



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                .REM    &
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IDENTIFICATION

PRODUCT CODE: AC-F241A-MC

PRODUCT NAME: CJKDCAC KEF11-AA FP DIAG PART 1

DATE CREATED: 20-JUN-79

MAINTAINER: DIAGNOSTIC ENGINEERING

CONTENTS

1. ABSTRACT

THE TWO PROGRAMS:

CJKDCA, CJKDDA

ARE DESIGN TO DETECT AND REPORT LOGIC FAULTS IN THE F-11 MMU AND FLOATING POINT CHIP SET. THE DESIGN IS AN ATTEMPT TO REACH ALL MIRCO-CODE LOCATIONS. TESTS ARE PARTITIONED INTO TWO STAND-ALONE PROGRAMS DESCRIBED BELOW.

NOTE THAT ERROR REPORTS IN THESE PROGRAMS ARE BASED UPON THE KNOWLEDGE THAT ALL PREVIOUS TESTS (CPU, MMU) HAVE BEEN RUN AND IN MOST CASE THAT THERE IS ONLY A SINGLE POINT FAULT EXISTS. IF THE PROGRAMS OR TESTS ARE NOT RUN IN ORDER THEN ERROR MESSAGES MAY NOT BE ACCURATE.

A. CJKDCA

CJKDCA TESTS: (FLOATING POINT TEST 1)

LDFPS
STFPS
CFCC
SETF, SETD, SETI AND SETL
STST
LDF AND LDD (ALL SOURCE MODES)
STD (MODE 0 AND 1)
ADDF, ADDD AND SUBD (MOST CONDITIONS)
ADDF, ADDD AND SUBD (ALL CONDITIONS NOT TESTED IN DFFPA)
CMPD AND CMPF
DIVD AND DIVF
MULD AND MULF
MODD AND MODF

B. CJKDDA

CJKDDA TESTS: (FLOATING POINT TEST 2)

STF AND STD (ALL MODES)
STCFD AND STCDF
CLRD AND CLRF
NEGF AND NEGD
ABSF AND ABSD
TSTF AND TSTD
NEGF, ABSF AND TSTF (ALL SOURCE MODES)
NEGF, ABSF AND TSTF (ALL SOURCE MODES)
LDFPS (ALL SOURCE MODES)

```
                                        LDCIF AND LDCLF
                                        LDCID AND LDCLD
                                        LDEXP
                                        STFPS (ALL DESTINATION MODES)
                                        STCFL AND STCFI
                                        STCDL AND STCDI
                                        STEXP
                                        STST


                    2.                  REQUIREMENTS
                                        ------------

                    2.1     EQUIPMENT

                            A PROCESSOR WITH THE DCF11-AA,KTF11-AA AND KEF11-A CHIP SET.

                    2.2     STORAGE

                            BOTH PROGRAMS REQUIRE  A  MEMORY  SYSTEM  OF  AT
                            LEAST 16K TO LOAD AND RUN.

                    2.3     PRELIMINARY PROGRAMS

                            THESE TWO  DIAGNOSTICS  WILL  ASSUME  THAT  THE
                            BASIC CENTRAL PROCESSOR IS FAULTLESS, THEREFORE
                            WHEN IN DOUBT RUN THE DCF11-AA PROCESSOR DIAG-
                            NOSTICS BEFORE THESE FLOATING POINT DIAGNOSTICS.


                    3.                  LOADING PROCEDURE
                                        -----------------

                            THE  PROGRAMS  WILL  BE  SUPPLIED  ON  THE  11/23
                            DIAGNOSTIC  MEDIA.  REFER  TO  THE  XXDP  OPERATING
                            MANUAL FOR FURTHER INFORMATION.

                    4.                  STARTING PROCEDURE
                                        ------------------

                    4.1     CONTROL SWITCH SETTINGS

                            SEE SECTION 5.1

                    4.2     PROGRAM AND OPERATOR ACTION

                            1.      LOAD PROGRAM INTO MEMORY
                            2.      LOAD ADDRESS 200
                            3.      SET CONSOLE SWITCHES (IF CONSOLE IS PRESENT)
                            4.      PRESS START
                                    ON FIRST PASS  THE  PROGRAM
                                    WILL IDENTIFY ITSELF.  NOTE THAT IF THERE IS
                                    NO PHYSICAL CONSOLE THE PROGRAM WILL REQUEST
                                    THE  OPERATOR  FOR  INITIAL  VALUE  FOR  THE
                                    SOFTWARE SWITCH REGISTER (SEE SECTION  8.5).
                                    IF RUNNING UNDER ACT, APT OR CHAIN THIS DOES
```

NOT APPLY.

5. THE PROGRAM WILL LOOP AND AN END OF PASS WILL BE TYPED AT THE END OF EVERY PASS.

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

THE SWITCH SETTING ARE:

	OCTAL	
SW<15>=1...	100000	HALT ON ERROR
SW<14>=1...	40000	LOOP ON CURRENT TEST
SW<13>=1...	20000	INHIBIT ERROR TYPE OUTS
SW<12>=1...	10000	INHIBIT T-BIT TRAPPING
SW<11>=1...	4000	INHIBIT ITERATIONS
SW<10>=1...	2000	RING TTY BELL ON ERROR
SW<9>=1....	1000	LOOP ON ERROR
SW<8>=1....	400	LOOP ON TEST SPECIFIED IN SW<6> THROUGH SW<0>

6. ERRORS

6.1 SUMMARIES

WHEN AN ERROR IS ENCOUNTERED, AN ERROR MESSAGE ACCOMPANIED BY THE ERROR PC ARE TYPED.
THERE ARE FOUR STANDARD ERROR MESSAGES USED, DESCRIBING THE PROBABLE CAUSE OF FAILURE, SUCH AS: PROBABLY BAD MMU CHIP; BAD FP1 CHIP; BAD HYBRID FP CHIP; FLOATING POINT ERROR.

6.2 ERROR RECOVERY

SW<15:9>=0...	MOST ERRORS WILL CAUSE EXECUTION TO GO TO THE START OF THE NEXT TEST AFTER THE MESSAGE IS TYPED. A FEW TESTS ARE IN SECTIONS. IN THESE TESTS AN ERROR WILL CAUSE EXECUTION TO GO TO THE NEXT SECTION AFTER THE MESSAGE IS TYPED.
SW<15>=1...	THE PROGRAM WILL HALT AFTER TYPING THE ERROR MESSAGE. PRESSING THE CONSOLE CONTINUE WILL CAUSE THE PROGRAM TO CONTINUE AS IF SW<15>=0.

7. RESTRICTIONS

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIMES

LESS THAN 2 SECONDS FOR EACH PROGRAM ON ANY PASS.

8.2 STACK POINTER

THE STACK POINTER IS INITIALIZED TO 1100 IN EACH OF THE TWO PROGRAMS.

8.3 PASS COUNT

THE PROGRAM MAKES ONE PASS FOR EACH END OF PASS MESSAGE TYPED. THE END OF PASS MESSAGE DESCRIBES THE TOTAL NUMBER OF PASSES COMPLETED.

8.4 T-BIT TRAPPING

IF SW<12>=0 EACH PROGRAM WILL RUN WITH TRACE TRAPS ON EVERY OTHER PASS. FIRST PASS WILL NOT ENABLE TRACE TRAPS. NOTE SW<12>=1 DISABLES T-BIT TRAPS.

8.5 SOFTWARE SWITCH REGISTER

EACH OF THE TWO PROGRAMS WILL RUN WITH OR WITHOUT A CONSOLE SWITCH REGISTER. IF A PHYSICAL CONSOLE SWITCH REGISTER IS PRESENT ON THE SYSTEM, THEN THESE PROGRAMS WILL GO AHEAD AND USE IT FOR THE SWITCH FUNCTIONS DESCRIBED IN 5.1 ABOVE. IF HOWEVER THERE IS NO CONSOLE SWITCH REGISTER ON THE SYSTEM A SOFTWARE SWITCH REGISTER WILL BE USED. THIS SOFTWARE SWITCH REGISTER CAN BE EXAMINED OR MODIFIED AT ANY TIME BY THE USER IF HE TYPES CONTROL G WHILE THE PROGRAM IS RUNNING. THIS CONTROL G WILL CAUSE THE CONTENTS OF THE SOFTWARE SWITCH REGISTER TO BE TYPED ON THE TTY AND ASK THE USER FOR A NEW VALUE. WHEN THE USER TYPES A VALUE AND CARRIAGE RETURN THEN THE PROGRAM WILL RESUME TESTING AT THE SAME POINT AT WHICH IT LEFT OFF WHEN THE USER TYPED CONTROL G. NOTE THAT WHEN NOT RUNNING UNDER ACT, APT OR CHAIN THE USER WILL BE ASKED FOR A SOFTWARE SWITCH REGISTER VALUE AFTER LOADING ADDRESS 200 AND STARTING THE PROGRAM THE FIRST TIME THE PROGRAM IS RUN AFTER LOADING (ONLY IF NO CONSOLE SWITCH REGISTER IS ON THE SYSTEM).

8.6 ACT, APT AND XXDP COMPATIBILTY

THESE PROGRAMS ARE FULLY COMPATIBLE WITH:
APT

ACT
XXDP MONITOR AND CHAIN PROGRAMS.

9. PROGRAM DESCRIPTION

TEST 1 LDFPS, STFPS AND DATA PATHS TEST

THIS IS A TEST OF THE LDFPS (LOAD FLOATING POINT STATUS) AND STFPS (STORE FLOATING POINT STATUS) INSTRUCTIONS. VARIOUS PATTERN ARE USED AND RUN THROUGH THE FLOATING POINT STATUS REGISTER. ONLY DM0 AND SM0 ARE USED. NOTE THAT A MASK MUST BE USED BECAUSE SOME OF THE FPS BITS CANNOT BE SET.

TEST 2 CFCC TEST

THIS IS A TEST OF THE COPY CONDITION CODES INSTRUCTION, CFCC.

TEST 3 SETF, SETD, SETI AND SETL TEST

THIS IS A TEST OF THE SETF, SETD, SETI AND SETL INSTRUCTIONS. EACH INSTRUCTION IS EXECUTED WITH THE FPS CONTAINING ALL ONES AND ALSO WITH THE FPS CLEAR. THE RESULT OF EACH SITUATION IS CHECKED.

TEST 4 ILLEGAL FPP OP CODES AND STST TEST

THIS IS A TEST OF THE FPP OPERATION CODES:

170003
170004
:
170010
170013
170014

```
                                        :
                                    170077

                THESE  ARE ILLEGAL INSTRUCTIONS AND WITH  INTERRUPTS
                ENABLED  SHOULD  CAUSE  A  TRAP TO 244.  ALSO TESTED
                HERE IS THE INSTRUCTION:  STST R1, WHICH SHOULD  PUT
                THE  FEC  CODE  2  IN  R1, AFTER ANY OF THE ABOVE OP
                CODES IS EXECUTED.

TEST 5          FID, INTERRUPT DISABLE, BIT TEST
------          --------------------------------

                THIS IS A TEST OF  FPS  BIT  14  (FID)  OR  FLOATING
                INTERRUPT   DISABLE.    AN  ILLEGAL  INSTRUCTION  IS
                EXECUTED WITH FID=1.  NO INTERRUPT SHOULD OCCUR.

TEST 6          LDD AND STD, WITH SRC AND DST MODE 1, TEST
------          ------------------------------------------

                THIS IS A TEST OF BOTH THE INSTRUCTION:
                                LDD     (R0),AC0
                AND THE INSTRUCTION:
                                STD     AC0,(R0)        MOST OF THE
                FAILURES ARE ISOLATED TO THE SRC OR DST FLOWS.  NOTE
                THAT THE INTEGRITY OF  AC0  HAS  NOT  BEEN  ASSURED.
                THIS  MEANS THAT IN SOME CASES IT WILL BE IMPOSSIBLE
                TO ISOLATE CERTAIN DATA PATTERN FAILURES  TO  EITHER
                THE FLOWS OR THIS ACCUMULATOR.

TEST 7          FSRC MODE 0 TEST
------          ----------------

                THIS IS A TEST OF FSRC MODE ZERO USING THE  LDD  AND
                LDF INSTRUCTIONS.


TEST 10         FDST MODE 0 TEST
-------         ----------------

                THIS IS A TEST OF THE STORE  INSTRUCTIONS,  STD  AND
                STF, WITH FDST MODE 0.

TEST 11         ACCUMULATORS DATA PATTERNS TEST
-------         -------------------------------

                THIS IS A  TEST  OF  THE  FLOATING  POINT  PROCESSOR
                ACCUMULATORS.

                EACH ACCUMULATOR IS TESTED IN TWO WAYS:
                        1       TEST PATTERN GENERATED BY FLOATING A
                        ONE ACROSS A FIELD OF ZEROES.
                        2       TEST PATTERN GENERATED BY FLOATING A
                        ZERO ACROSS A FIELD OF ONES.
                EACH OF ACCUMULATORS AC0 THROUGH AC5 IS TESTED.
TEST 12         FPP ACCUMULATORS DUAL ADDRESS TEST
-------         ----------------------------------
```

```
                        THIS TEST PERFORMS A DUAL  ADDRESSING  TEST  ON  THE
                        FLOATING  ACCUMULATORS.   NOTE THAT ACCUMULATOR ZERO
                        IS USED TO ACCESS ALL THE OTHERS.

TEST 13                 FSRC MODE 0 WITH ILLEGAL ACCUMULATOR TEST
-------                 -----------------------------------------

                        THIS IS A TEST OF FSRC MODE 0  WITH  ACCUMULATORS  6
                        AND   7.    USE  OF  EITHER  OF  THESE  NON-EXISTENT
                        ACCUMULATORS SHOULD RESULT IN A  TRAP  TO  244  WITH
                        FEC=2 (ILLEGAL FPP INSTRUCTION).


TEST 14                 FSRC MODE 2 TEST
-------                 ----------------

                        THIS IS A TEST OF FSRC MODE 2, AUTO INCREMENT MODE.

TEST 15                 FSRC MODE 4 TEST
-------                 ----------------

                        THIS IS A TEST OF FSRC MODE 4, AUTO DECREMENT MODE.

TEST 16                 FSRC MODE 2, WITH FD=0, TEST
-------                 ----------------------------

                        THIS IS A TEST OF FSRC  MODE  2  WITH  FD=0.   (AUTO
                        INCREMENT)

TEST 17                 FSRC MODE 2 WITH GR7, IMMEDIATE MODE, TEST
-------                 ------------------------------------------

                        THIS IS A TEST OF FSRC MODE 2 USING  GR7  (THE  PC).
                        THIS IS IMMEDIATE MODE.

TEST 20                 FSRC MODE 3 TEST
-------                 ----------------

                        THIS IS A  TEST  OF  FSRC  MODE  3,  AUTO  INCREMENT
                        DEFERRED

TEST 21                 FSRC MODE 5 TEST
-------                 ----------------

                        THIS IS A  TEST  OF  FSRC  MODE  5,  AUTO  DECREMENT
                        DEFERRED.

TEST 22                 FSRC MODE 6 TEST
-------                 ----------------

                        THIS IS A TEST OF FSRC MODE 6, INDEX MODE

TEST 23                 FSRC MODE 7 TEST
-------                 ----------------
```

```
                        THIS IS A TEST OF FSRC MODE 7, INDEX DEFERRED MODE.

TEST 24         (BUT EZBT Y8),(BUT ENBT) AND (BUT FIUV) TEST
-------         --------------------------------------------

                THIS IS A TEST OF THE (BUT EZBT Y8) FORK,  THE  (BUT
                ENBT)   FORK   AND  (BUT  FIUV)  FORK  IN  THE  LOAD
                INSTRUCTION FLOWS.
                EACH OF THE PATTERNS:

                                0
                                +NUM
                                -NUM
                                -0

                IS LOADED TWICE, ONCE  WITH  AC>0  THEN  WITH  AC=0.
               AFTER  EACH  LOAD  THE  FPS  IS  CHECK TO INSURE THAT
                CONTROL WAS PASSED THROUGH WITH THE FORKS PROPERLY.

TEST 25         ADDF,ADDD,SUBF AND SUBD WITH FSRC=AC=0 TEST
-------         -------------------------------------------

                THIS IS A TEST OF ADD AND SUB WITH FSRC=AC=0

TEST 26         ADDD AND SUB WITH FSRC=0
-------         -----------------------

                THIS IS A TEST OF ADD AND SUB WITH FSRC=0.

TEST 27         SUBD WITH AC=0 TEST
-------         -------------------

                THIS IS A TEST OF SUBD WITH AC=0.  BOTH POSITIVE AND
                NEGATIVE FSRC'S ARE TRIED.

TEST 30         ADDD WITH AC=0 TEST
-------         -------------------

                POSITIVE AND NEGATIVE FSRC'S ARE TRIED.

TEST 31         ADDF AND ADDD WITH E(AC)=E(FSRC) AND (BUT FT) TEST
-------         -------------------------------------------------

                THIS IS A TEST  OF  THE  ADD  INSTRUCTION  WITH  THE
                OPERANDS  HAVING EQUAL EXPONENTS.  THE (BUF FT) FORK
                IN THE ROUND/TRUNK FLOWS IS ALSO TESTED.

TEST 32         ADDF AND ADDD WITH E(AC) LESS  THAN  E(FSRC) TEST
-------         -------------------------------------------------

                THIS IS ATEST OF THE ADDD AND ADDF INSTRUCTIONS  AND
                THE  ALIGN AC ALGORITHM FLOWS.  THE CONSTANT (25 FOR
                FLOATING, 57 FOR  DOUBLE)  USED  IS  CHECKED.   THEN
                SIMPLE  AND  WORST  CASE  ALIGNMENT  SITUATIONS  ARE
                TRIED.  NOTE E(AC) IS LESS THEN E(FSRC)
```

```
                TEST 33         ADDF AND ADDD WITH E(AC) GREATER THAN E(FSRC) TEST
                -------         --------------------------------------------------

                        THIS IS A TEST OF THE ADDD AND ADDF INSTRUCTIONS AND
                        THE  ALIGN FSRC ALGORITHM FLOWS.  FIRST THE CONSTANT
                        USED  IS  CHECKED.  THEN  SIMPLE  AND  WORST  CASE
                        ALIGNMENT  SITUATIONS  ARE  TRIED.  NOTE  E(AC)  IS
                        GREATER THAN E(FSRC).

                TEST 34         ADDD WITH NEGATVE OPRANDS TEST
                -------         ------------------------------

                        THIS IS A TEST OF THE ADDD INSTRUCTION WITH NEGATIVE
                        OPERANDS.  EVERY  COMBINATION  OF  OPERAND SIGNS IS
                        TRIED.

                TEST 35         SUBD TEST
                -------         ---------

                        THIS IS A TEST OF  THE  SUBD  INSTRUCTION.  BOTH  A
                        POSITIVE AND A NEGATIVE NUMBER IS SUBTRACTED FROM IT
                        SELF

                TEST 36         NORMALIZE ALGORITHM TEST
                -------         ------------------------

                        THIS IS A TEST OF THE NORMALIZE FLOW ALGORITHM.  TWO
                        PATTERNS  ARE  USED,  FIRST  THE  MINIMUM  SITUATION
                        REQUIRING  ONE  LEFT  SHIFT  AND  THEN  THE  MAXIMUM
                        SITUATION REQUIRING 56 SHIFTS.



                TEST 37         ROUND\TRUNK TEST
                -------         ----------------

                        THIS  IS  A  TEST  OF  THE  ROUND\TRUNK  FLOWS.   IN
                        PARTICULAR TWO THINGS ARE TESTED:  FIRST A CONDITION
                        IN  WHICH  ROUNDING  RESULTS  IN  THE  NEED  FOR
                        RENORMALIZATION,  AND SECOND THE PSW CONDITION CODES
                        N AND Z BIT COMMBINATIONS

                TEST 40         OVER\UNDER TEST
                -------         ---------------

                        THIS IS A PARTIAL TEST OF THE OVER\UNDER FLOWS.  ONE
                        OVERFLOW  AND  TWO UNDERFLOW CONDITIONS ARE CHECKED.
                        THE REMAINING UNDERFLOW  COND.  AND  THE  REMAINING
                        OVERFLOW  COND.  WILL BE CHECKED LATER USING THE XXX
                        INSTRUCTION.  HERE EACH CONDITION TESTED IS  CHECKED
                        BOTH  WITH  TRAPS  ENABLED (FIU=1 OR FIV=1) AND ALSO
                        WITH TRAPS DISABLED (FIU=0 OR FIV=0).

                TEST 41         LDCFD AND LDCDF TEST
                -------         --------------------
```

```
                        THIS IS A TEST OF LDCFD AND LDCDF.

TEST 42                 CMPD TEST
-------                 ---------

                        THIS IS A TEST OF THE CMPD INSTRUCTION.  NOTE THAT A
                        SUBROUTINE  IS  USED TO SET UP OPERANDS, EXECUTE THE
                        INSTRUCTION AND CHECK THE RESULTS

TEST 43                 DIVD WITH (FSRC=0) AND (BUT FD) TEST
-------                 ------------------------------------

                        THIS IS A TEST OF THE DIVD INSTRUCTION WITH  A  ZERO
                        DIVISOR.   THE  CONDITION  IS CHECKED WITH BOTH TRAP
                        ENABLED AND TRAPS DISABLED.

TEST 44                 DIVF TEST
-------                 ---------

                        THIS IS A TEST OF THE DIVF INSTRUCTION.  NOTE THAT A
                        SUBROUTINE  IS  USED TO SET UP THE OPERANDS, EXECUTE
                        THE INSTRUCTION AND CHECK THE RESULTS.

TEST 45                 DIVD TEST
-------                 ---------

                        THIS IS A TEST OF THE DIVD INSTRUCTION.  NOTE THAT A
                        SUBROUTINE  IS  USED TO SET UP THE OPERANDS, EXECUTE
                        THE INSTRUCTION AND CHECK THE RESULTS.

TEST 46                 MULF TEST
-------                 ---------
                        THIS IS A TEST OF THE MULF  INSTRUCTION.   IT  MAKES
                        USE  OF A SUBROUTINE TO SET UP THE OPERANDS, EXECUTE
                        THE MULF  INSTRUCTION AND CHECK THE RESULTS.

TEST 47                 MULD TEST
-------                 ---------

                        THIS IS A TEST OF THE MULD INSTRUCTION.  NOTE THAT A
                        SUBROUTINE  IS  USED TO SET UP THE OPERANDS, EXECUTE
                        THE MULD INSTRUCTION AND CHECK THE RESULTS.

TEST 50                 UNDER\OVER FLOW, USING MULF WITH TRAPS DISABLED, TEST
-------                 ----------------------------------------------------

                        THIS  IS  A  TEST  OF  THE  OVERFLOW  AND  UNDERFLOW
                        CONDITIONS  USING  THE  MULF  INSTRUCTION WITH TRAPS
                        DISABLED.  NOTE THAT A SUBROUTINE IS USED TO SET  UP
                        THE OPERANDS, EXECUTE THE MULF INSTRUCTION AND CHECK
                        THE RESULTS.

TEST 51                 UNDER\OVER FLOW, USING MULD WITH TRAPS DISABLED, TEST
-------                 ----------------------------------------------------
```

```
                        THIS  IS  A  TEST  OF  THE  OVERFLOW  AND  UNDERFLOW
                        CONDITIONS  THAT  CAN  ARRISE  USING  THE  MULD
                        INSTRUCTION WITH TRAPS DISABLED.  A SUBROUTINE  IS
                        USED  TO  SET  UP  THE  OPERANDS,  EXECUTE  THE MULD
                        INSTRUCTION AND CHECK THE RESULTS.

TEST 52         UNDER\OVER FLOW, USING MULF WITH TRAPS ENABLED, TEST
-------         ---------------------------------------------------

                        THIS  IS  A  TEST  OF  THE  UNDERFLOW  AND  OVERFLOW
                        CONDITIONS  THAT  CAN  OCCUR  USING  THE  MULF
                        INSTRUCTION.  A SUBROUTINE IS CALLED TO SET  UP  THE
                        OPERANDS, EXECUTE THE MULF INSTRUCTION AND CHECK THE
                        RESULTS.  HERE  THE  PARTICULAR  INTERRUPT,  EITHER
                        OVERFLOW  OR  UNDERFLOW, IS ENABLED SO A TRAP SHOULD
                        OCCUR.

TEST 53         UNDER\OVER FLOW, USING MULD WITH TRAPS ENABLED, TEST
-------         ---------------------------------------------------

                        THIS IS A TEST OF  THE  OVER  FLOW  AND  UNDER  FLOW
                        CONDITIONS  USING  THE  MULD  INSTRUCTION WITH TRAPS
                        ENABLED.  A  SUBROUTINE  IS  USED  TO  SET  UP  THE
                        OPERANDS, EXECUTE THE MULD INSTRUCTION AND CHECK THE
                        RESULTS.

TEST 54         MODF TEST
-------         ---------

                        THIS IS A TEST OF THE MODF INSTRUCTION, WHICH  MAKES
                        USE  OF A SUBROUTINE TO SET UP THE OPERANDS, EXECUTE
                        THE MODF INSTRUCTION AND CHECK THE RESULTS.

TEST 55         MODD TEST
-------         ---------

                        THIS IS A TEST OF THE MODD  INSTRUCTION.  IT  MAKES
                        USE OF A SUBROUTINE TO SET UP THE ARGUMENTS, EXECUTE
                        THE INSTRUCTION AND CHECK THE RESULTS.

TEST 56         UNDER\OVER FLOW, USING MODF WITH TRAPS DISABLED, TEST
-------         ---------------------------------------------------

                        THIS IS A TEST OF THE MODF  OVERFLOW  AND  UNDERFLOW
                        CONDITIONS.  IT  MAKES USE OF A SUBROUTINE TO SETUP
                        THE OPERANDS, EXECUTE THE MODF INSTRUCTION AND CHECK
                        THE RESULTS.  TRAPS ARE DISABLED DURING THIS TEST.

TEST 57         UNDER\OVER FLOW, USING MODD WITH TRAPS DISABLED, TEST
-------         ---------------------------------------------------

TEST 60         MORE MICROCODES COVERAGE, TEST
-------         ------------------------------
```

```
704
705
706
707
708
709                                 10.                 LISTING
710                                                     -------
711                                 &
```

```
                                .LIST   ME
                                .NLIST  MD,MC,CND




                                .ENABL  ABS


                                .TITLE  CJKDCA-A KEF11-A FP DIAG PART 1
                                ;*COPYRIGHT (C) DEC  1978
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*PROGRAM BY DIAGNOSTIC ENGINEERING
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                                ;*
000001                          $TN=1
160000                          $SWR=160000     ;;HALT ON ERROR, LOOP ON TEST, INHIBIT ERROR TYPOUT


000244                          FPVECT=244
177400                          $SWR=177400
000200                          $SWRMSK=200
000011                          TAB=11
000015                          CRLF=15

                                .SBTTL  BASIC DEFINITIONS

                                ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                          STACK=  1100
                                .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                                .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL
```

```
                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE FOR LINE FEED
000015                  CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                  R0=     %0              ;;GENERAL REGISTER
000001                  R1=     %1              ;;GENERAL REGISTER
000002                  R2=     %2              ;;GENERAL REGISTER
000003                  R3=     %3              ;;GENERAL REGISTER
000004                  R4=     %4              ;;GENERAL REGISTER
000005                  R5=     %5              ;;GENERAL REGISTER
000006                  R6=     %6              ;;GENERAL REGISTER
000007                  R7=     %7              ;;GENERAL REGISTER
000006                  SP=     %6              ;;STACK POINTER
000007                  PC=     %7              ;;PROGRAM COUNTER

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7

                        ;*''SWITCH REGISTER'' SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
000002                  SW01=   2
000001                  SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
```

```
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV  SW03,SW3
                        .EQUIV  SW02,SW2
                        .EQUIV  SW01,SW1
                        .EQUIV  SW00,SW0

                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000                  BIT15=  100000
040000                  BIT14=  40000
020000                  BIT13=  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02=  4
000002                  BIT01=  2
000001                  BIT00=  1
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
                        .EQUIV  BIT01,BIT1
                        .EQUIV  BIT00,BIT0

                        ;*BASIC ''CPU'' TRAP VECTOR ADDRESSES
000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
000014                  TBITVEC=14              ;;''T'' BIT
000014                  TRTVEC= 14              ;;TRACE TRAP
000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024                  PWRVEC= 24              ;;POWER FAIL
000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
000034                  TRAPVEC=34              ;;''TRAP'' TRAP
000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
                                .SBTTL  FPP REGISTER DEFINITIONS
000000                  AC0     =%0
000001                  AC1     =%1
000002                  AC2     =%2
000003                  AC3     =%3
000004                  AC4     =%4
000005                  AC5     =%5
000006                  AC6     =%6
```

```
                000007                  AC7     =%7
                                        .SBTTL  TRAP CATCHER
                000000                          .=0
                                        ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                        ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                        ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                000174                          .=174
000174  000000                         DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
000176  000000                         SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
                                        .SBTTL  STARTING ADDRESS(ES)
000200  000137  001466                         JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
```

```
                        .SBTTL  COMMON TAGS

                        ;;*****************************************************************
                        ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                        ;*USED IN THE PROGRAM.

                001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD   0
001102     000          $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
001103     000          $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
001104  000000          $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000          $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000          $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000          $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
001114     000          $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
001115     001          $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
001116  000000          $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000          $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000          $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000          $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
001126  000000          $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
001130  000000                  .WORD   0               ;;RESERVED--NOT TO BE USED
001132  000000                  .WORD   0
001134     000          $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
001135     000          $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
001136  000000                  .WORD   0
001140  177570          SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001142  177570          DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
001144  177560          $TKS:   177560                  ;;TTY KBD STATUS
001146  177562          $TKB:   177562                  ;;TTY KBD BUFFER
001150  177564          $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566          $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001154     000          $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001155     002          $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156     012          $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A 'LINE FEED'
001157     000          $TPFLG: .BYTE   0               ;;'TERMINAL AVAILABLE' FLAG (BIT<07>=0=YES)
001160  000000          $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REG0) WAS OBTAINED
001162  000000          $REG0:  .WORD   0               ;;CONTAINS (($REGAD)+0)
001164  000000          $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
001166  000000          $REG2:  .WORD   0               ;;CONTAINS (($REGAD)+4)
001170  000000          $REG3:  .WORD   0               ;;CONTAINS (($REGAD)+6)
001172  000000          $REG4:  .WORD   0               ;;CONTAINS (($REGAD)+10)
001174  000000          $REG5:  .WORD   0               ;;CONTAINS (($REGAD)+12)
001176  000000          $REG6:  .WORD   0               ;;CONTAINS (($REGAD)+14)
001200  000000          $REG7:  .WORD   0               ;;CONTAINS (($REGAD)+16)
001202  000000          $REG10: .WORD   0               ;;CONTAINS (($REGAD)+20)
001204  000000          $REG11: .WORD   0               ;;CONTAINS (($REGAD)+22)
001206  000000          $REG12: .WORD   0               ;;CONTAINS (($REGAD)+24)
001210  000000          $REG13: .WORD   0               ;;CONTAINS (($REGAD)+26)
001212  000000          $REG14: .WORD   0               ;;CONTAINS (($REGAD)+30)
001214  000000          $REG15: .WORD   0               ;;CONTAINS (($REGAD)+32)
001216  000000          $REG16: .WORD   0               ;;CONTAINS (($REGAD)+34)
001220  000000          $REG17: .WORD   0               ;;CONTAINS (($REGAD)+36)
001222  000000          $REG20: .WORD   0               ;;CONTAINS (($REGAD)+40)
```

```
  949  001224  000000                $REG21: .WORD   0               ;;CONTAINS (($REGAD)+42)
  950  001226  000000                $REG22: .WORD   0               ;;CONTAINS (($REGAD)+44)
  951  001230  000000                $REG23: .WORD   0               ;;CONTAINS (($REGAD)+46)
  952  001232  000000                $TMP0:  .WORD   0               ;;USER DEFINED
  953  001234  000000                $TMP1:  .WORD   0               ;;USER DEFINED
  954  001236  000000                $TMP2:  .WORD   0               ;;USER DEFINED
  955  001240  000000                $TMP3:  .WORD   0               ;;USER DEFINED
  956  001242  000000                $TMP4:  .WORD   0               ;;USER DEFINED
  957  001244  000000                $TMP5:  .WORD   0               ;;USER DEFINED
  958  001246  000000                $TMP6:  .WORD   0               ;;USER DEFINED
  959  001250  000000                $TMP7:  .WORD   0               ;;USER DEFINED
  960  001252  000000                $TMP10: .WORD   0               ;;USER DEFINED
  961  001254  000000                $TMP11: .WORD   0               ;;USER DEFINED
  962  001256  000000                $TMP12: .WORD   0               ;;USER DEFINED
  963  001260  000000                $TMP13: .WORD   0               ;;USER DEFINED
  964  001262  000000                $TMP14: .WORD   0               ;;USER DEFINED
  965  001264  000000                $TMP15: .WORD   0               ;;USER DEFINED
  966  001266  000000                $TMP16: .WORD   0               ;;USER DEFINED
  967  001270  000000                $TMP17: .WORD   0               ;;USER DEFINED
  968  001272  000000                $TMP20: .WORD   0               ;;USER DEFINED
  969  001274  000000                $TMP21: .WORD   0               ;;USER DEFINED
  970  001276  000000                $TMP22: .WORD   0               ;;USER DEFINED
  971  001300  000000                $TMP23: .WORD   0               ;;USER DEFINED
  972  001302  000000                $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
  973  001304  000000                $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
  974  001306  177607  000377       $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
  975  001312     077                $QUES:  .ASCII  /?/             ;;QUESTION MARK
  976  001313     015                $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
  977  001314  000012                $LF:    .ASCIZ  <12>            ;;LINE FEED
  978                                ;;*****************************************************************
  979                                .SBTTL  APT MAILBOX-ETABLE
  980
  981                                ;;*****************************************************************
  982                                .EVEN
  983  001316                        $MAIL:                          ;;APT MAILBOX
  984  001316  000000                $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
  985  001320  000000                $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
  986  001322  000000                $TESTN: .WORD   ATESTN          ;;TEST NUMBER
  987  001324  000000                $PASS:  .WORD   APASS           ;;PASS COUNT
  988  001326  000000                $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
  989  001330  000000                $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
  990  001332  000000                $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
  991  001334  000000                $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
  992  001336                        $ETABLE:                        ;;APT ENVIRONMENT TABLE
  993  001336     000                $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
  994  001337     000                $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
  995  001340  000000                $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
  996  001342  000000                $USWR:  .WORD   AUSWR           ;;USER SWITCHES
  997  001344  000000                $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
  998                                ;*                              BITS 15-11=CPU TYPE
  999                                ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
 1000                                ;*                                      11/70=06,PDQ=07,Q=10
 1001                                ;*                              BIT 10=REAL TIME CLOCK
 1002                                ;*                              BIT  9=FLOATING POINT PROCESSOR
 1003                                ;*                              BIT  8=MEMORY MANAGEMENT
 1004  001346     000                $MAMS1: .BYTE   AMAMS1          ;;HIGH ADDRESS,M.S. BYTE
```

```
 1005  001347     000                  $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
 1006                                   ;*                     MEM.TYPE BYTE   --  (HIGH BYTE)
 1007                                   ;*                             900 NSEC CORE=001
 1008                                   ;*                             300 NSEC BIPOLAR=002
 1009                                   ;*                             500 NSEC MOS=003
 1010  001350  000000                  $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
 1011                                   ;*                       MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF ''TYPE'' ABOVE
 1012  001352     000                  $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
 1013  001353     000                  $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
 1014  001354  000000                  $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
 1015  001356     000                  $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
 1016  001357     000                  $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
 1017  001360  000000                  $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
 1018  001362     000                  $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
 1019  001363     000                  $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
 1020  001364  000000                  $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
 1021  001366  000000                  $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
 1022  001370  000000                  $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
 1023  001372  000000                  $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
 1024  001374  000000                  $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
 1025  001376  000000                  $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
 1026  001400  000000                  $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
 1027  001402  000000                  $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
 1028  001404  000000                  $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
 1029  001406  000000                  $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
 1030  001410  000000                  $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
 1031  001412  000000                  $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
 1032  001414  000000                  $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
 1033  001416  000000                  $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
 1034  001420  000000                  $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
 1035  001422  000000                  $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
 1036  001424  000000                  $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
 1037  001426  000000                  $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
 1038  001430  000000                  $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
 1039  001432  000000                  $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
 1040  001434  000000                  $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
 1041  001436  000000                  $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
 1042  001440  000000                  $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
 1043
 1044
 1045  001442                          $ETEND:
 1046
```

```
                                        .SBTTL  ERROR POINTER TABLE

                                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                        ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                        ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                        ;*NOTE2:       EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                                        ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                        ;*      DH              ;;POINTS TO THE DATA HEADER
                                        ;*      DT              ;;POINTS TO THE DATA
                                        ;*      DF              ;;POINTS TO THE DATA FORMAT

001442                                  $ERRTB:
                                        ;ITEM NUMBER
001442  062753                          .WORD   EM1
001444  063001                          .WORD   EM2
001446  063035                          .WORD   EM3
001450  063063                          .WORD   EM4

                                        .SBTTL  ACT11 HOOKS

                                        ;;**************************************************************
                                        ;HOOKS REQUIRED BY ACT11
        001452                                  $SVPC=.                 ;SAVE PC
        000046                                  .=46
000046  057370                                  $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
        000052                                  .=52
000052  000000                                  .WORD   0               ;;2)SET LOC.52 TO ZERO
        001452                                  .=$SVPC                 ;; RESTORE PC
                                .SBTTL  APT PARAMETER BLOCK

                                ;;**************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;**************************************************************
        001452                          .$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  001452                          $APTHDR ;;POINT TO APT HEADER BLOCK
        001452                          .=.$X   ;;RESET LOCATION COUNTER
                                ;;**************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.

001452                          $APTHD:
001452  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001454  001316                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
001456  000010                  $TSTM:  .WORD   10      ;;RUN TIM OF LONGEST TEST
001460  000040                  $PASTM: .WORD   40      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001462  000000                  $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001464  000052                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
1103  001466                                  START:
1104                                          .SBTTL  INITIALIZE THE COMMON TAGS
1105                                          ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
1106  001466  012706  001100                         MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
1107  001472  005026                                 CLR     (R6)+           ;;CLEAR MEMORY LOCATION
1108  001474  022706  001140                         CMP     #SWR,R6 ;;DONE?
1109  001500  001374                                 BNE     .-6             ;;LOOP BACK IF NO
1110  001502  012706  001100                         MOV     #STACK,SP       ;;SETUP THE STACK POINTER
1111                                          ;;INITIALIZE A FEW VECTORS
1112  001506  012737  057464  000020                 MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
1113  001514  012737  000340  000022                 MOV     #340,@#IOTVEC+2 ;;LEVEL 7
1114  001522  012737  057744  000030                 MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
1115  001530  012737  000340  000032                 MOV     #340,@#EMTVEC+2 ;;LEVEL 7
1116  001536  012737  062100  000034                 MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
1117  001544  012737  000340  000036                 MOV     #340,@#TRAPVEC+2;LEVEL 7
1118  001552  012737  062166  000024                 MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
1119  001560  012737  000340  000026                 MOV     #340,@#PWRVEC+2 ;;LEVEL 7
1120  001566  016767  055526  055516                 MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
1121  001574  005067  177502                        CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
1122  001600  005067  177500                        CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
1123  001604  112767  000001  177303                 MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
1124                                          ;;INITIALIZE THE ''T-BIT'' TRAP VECTOR. THEN LOAD LOCATION ''$RTRN'', IN
1125                                          ;;THE ''END-OF-PASS'' ($EOP) ROUTINE, WITH A ''RTI'' OR ''RTT''.
1126  001612  012737  057434  000014                 MOV     #$RTRN,@#TBITVEC ;;SET ''T'' BIT VECTOR TO $RTRN
1127  001620  012737  000340  000016                 MOV     #340,@#TBITVEC+2 ;;LEVEL 7
1128  001626  012767  000002  055600                 MOV     #RTI,$RTRN      ;;SET $RTRN TO A RTI
1129  001634  012737  001662  000010                 MOV     #65$,@#RESVEC   ;;TRY TO DO A RTT
1130  001642  005046                                 CLR     -(SP)           ;;DUMMY PS
1131  001644  012746  001652                         MOV     #64$,-(SP)      ;;AND PC
1132  001650  000006                                 RTT                     ;;TRY THE RTT
1133  001652  012767  000006  055554  64$:    MOV     #RTT,$RTRN      ;;RTT IS LEGAL--SET $RTRN TO A RTT
1134  001660  000402                                 BR      66$
1135  001662  062706  000010          65$:    ADD     #10,SP          ;;RTT ILLEGAL--CLEAN OFF THE STACK
1136  001666  012737  000012  000010  66$:    MOV     #RESVEC+2,@#RESVEC ;;RESTORE TRAP CATCHER
1137  001674  005067  055542                        CLR     $TBIT           ;;CLEAR ''T'' BIT SWITCH
1138  001700  012767  001700  177200                 MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
1139  001706  012767  001706  177174                 MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
1140                                          ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
1141                                          ;;EQUAL TO A ''-1'', SETUP FOR A SOFTWARE SWITCH REGISTER.
1142  001714  013746  000004                         MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
1143  001720  012737  001754  000004                 MOV     #67$,@#ERRVEC   ;;SET UP ERROR VECTOR
1144  001726  012767  177570  177204                 MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
1145  001734  012767  177570  177200                 MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
1146  001742  022777  177777  177170                 CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
1147  001750  001012                                 BNE     69$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
1148                                                                          ;;AND  THE HARDWARE SWR IS NOT = -1
1149  001752  000403                                 BR      68$             ;;BRANCH IF NO TIMEOUT
1150  001754  012716  001762          67$:    MOV     #68$,(SP)       ;;SET UP FOR TRAP RETURN
1151  001760  000002                                 RTI
1152  001762  012767  000176  177150  68$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
1153  001770  012767  000174  177144                 MOV     #DISPREG,DISPLAY
1154  001776  012637  000004          69$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
1155
1156  002002  005067  177316                        CLR     $PASS           ;;CLEAR PASS COUNT
1157  002006  132767  000200  177323                 BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
1158  002014  001403                                 BEQ     70$             ;;YES,USE NON-APT SWITCH
```

```
1159   002016  012767  001340  177114          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
1160   002024                          70$:
1161                                   .SBTTL  TYPE PROGRAM NAME
1162                                   ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
1163   002024  005227  177777                  INC     #-1             ;;FIRST TIME?
1164   002030  001053                          BNE     71$             ;;BRANCH IF NO
1165   002032  022737  057370  000042          CMP     #$ENDAD,@#42    ;;ACT-11?
1166   002040  001447                          BEQ     71$             ;;BRANCH IF YES
1167   002042  104401  002110                  TYPE    ,72$            ;;TYPE ASCIZ STRING
1168                                   .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
1169   002046  005737  000042                  TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
1170   002052  001012                          BNE     73$             ;;BRANCH IF YES
1171   002054  126727  177256  000001          CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
1172   002062  001406                          BEQ     73$             ;;BRANCH IF YES
1173   002064  026727  177050  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
1174   002072  001005                          BNE     74$             ;;BRANCH IF NO
1175   002074  104406                          GTSWR                   ;;GET SOFT-SWR SETTINGS
1176   002076  000403                          BR      74$
1177   002100  112767  000001  177026  73$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
1178   002106                          74$:
1179   002106  000424                          BR      71$             ;;GET OVER THE ASCIZ
1180                                   ;;72$:  .ASCIZ  <CRLF>*CJKDCA, KEF11-A FP DIAGNOSTIC PART 1*<CRLF>
1181   002160                          71$:
1182
1183   002160                          LOOP:
1184   002160  012706  001100                  MOV     #STACK,SP       ;SET UP STACK POINTER
1185   002164  012737  002220  000004          MOV     #1$,@#4         ;SET UP FOR TIMEOUT IF NO MULTI-TESTER
1186   002172  012737  000340  000006          MOV     #340,@#6
1187   002200  012737  000002  164000          MOV     #2,@#164000     ;SET ''GO'' ON MULTI-TESTER
1188   002206  012737  000006  000004          MOV     #6,@#4          ;RESTORE TRAP CATCHER
1189   002214  005037  000006                  CLR     @#6
1190   002220                          1$:
1191
1192
1193
1194
1195
1196                                   ;;*********************************************************************
1197                                   ;*TEST 1        LDFPS, STFPS AND DATA PATHS TEST
1198                                   ;*
1199                                   ;*THIS IS A TEST OF THE LDFPS (LOAD FLOATING POINT STATUS) AND STFPS
1200                                   ;*(STORE FLOATING POINT STATUS) INSTRUCTIONS. A COUNT PATTERN IS GENERATED
1201                                   ;*AND RUN THROUGH THE FLOATING POINT STATUS REGISTER.
1202                                   ;*DM0 AND SM0 ARE USED.
1203                                   ;*NOTE THAT A MASK MUST BE USED BECAUSE SOME OF THE FPS BITS CANNOT
1204                                   ;*BE SET.
1205                                   ;*
1206                                   ;;*********************************************************************
1207   002220  000004                  TST1:   SCOPE
1208   002222  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1209   002224  012700  177777                  MOV     #-1,R0          ;INITIALIZE THE COUNT PATTERN.
1210   002230  012737  002336  000244          MOV     #AERR1,@#FPVECT         ;SET UP FOR UNABLE TO DECODE
1211   002236  012737  002350  000010          MOV     #AERR2,@#10             ;FPP INSTRUCTION TRAP TO 244 OR 10.
1212   002244  012737  002402  000004          MOV     #AERR3,@#ERRVECT        ;IF EITHER INSTRUCTION
1213                                                                           ;FAILS TO GO THROUGH THE
1214                                                                           ;CORRECT SRC OR DST MODE AN
```

```
1215
1216  002252                                  A1:                                     ;ODD ADDRESS TRAP WILL OCCUR.
1217  002252  010004                          A11:    MOV     R0,R4
1218  002254  042704  030020                        BIC     #30020,R4
1219  002260  170104                                 LDFPS   R4                      ;TEST INSTRUCTION.
1220
1221  002262  012701  177777                        MOV     #-1,R1
1222  002266  170201                         A12:    STFPS   R1                      ;TEST INSTRUCTION.
1223  002270  012737  062534  000244               MOV     #FPSPUR,@#FPVECT        ;SET UP FOR UNEXPECTED TRAPS.
1224  002276  010004                               MOV     R0,R4                   ;MASK OFF UNSETTABLE BITS.
1225  002300  042704  030020                       BIC     #30020,R4
1226  002304  012737  062566  000004               MOV     #CPSPUR,@#ERRVECT
1227  002312  012737  062604  000010               MOV     #CPTWO,@#10
1228  002320  020401                               CMP     R4,R1                   ;COMPARE DATA EXPECTED WITH
1229                                                                                ;THE DATA READ.
1230  002322  001401                               BEQ     A2                      ;IF NOT EQUAL GO REPORT ERROR.
1231  002324  104004                               ERROR   4
1232
1233  002326  012700  000001                A2:    MOV     #1,R0                   ;NEXT PATTERN WILL BE ALL ZERO
1234  002332  077031                               SOB     R0,A1                   ;DECREMENT COUNT PATTERN
1235  002334  000443                               BR      ADONE                   ;UNTIL IT IS ZERO.
1236
1237
1238                                          ;UNABLE TO DECODE FPP INSTRUCTION. TRAPPED TO 244.
1239  002336  011637  001236                AERR1:  MOV     (SP),@#$TMP2            ;SAVE PC OF TRAP.
1240  002342  022626                               CMP     (SP)+,(SP)+
1241  002344  104004                         1$:   ERROR   4
1242  002346  000436                               BR      ADONE
1243
1244                                          ;UNABLE TO DECODE INSTRUCTION. TRAPPED TO 10.
1245  002350  021627  002254                AERR2:  CMP     (SP),#A11+2             ;DID TRAP OCCUR OF FPP INSTRUCTION?
1246  002354  001405                               BEQ     1$
1247  002356  021627  002270                       CMP     (SP),#A12+2
1248  002362  001402                               BEQ     1$
1249  002364  000137  062604                       JMP     @#CPTWO                 ;IF NOT FPP INSTRUCTION THEN
1250                                                                                ;REPORT SPURIOUS TRAP TO 10.
1251
1252  002370  011637  001236                1$:    MOV     (SP),@#$TMP2            ;OTHERWISE REPORT IR DECODE ERROR.
1253  002374  022626                               CMP     (SP)+,(SP)+
1254  002376  104004                         2$:   ERROR   4
1255  002400  000421                               BR      ADONE
1256
1257                                          ;TRAP TO 4 HANDLER:
1258  002402  021627  002254                AERR3:  CMP     (SP),#A11+2             ;DID THE TRAP OCCUR ON THE
1259  002406  001405                               BEQ     1$                      ;LDFPS INSTRUCTION?
1260  002410  021627  002270                       CMP     (SP),#A12+2             ;OR THE STFPS INSTRUCTION?
1261  002414  001407                               BEQ     2$
1262  002416  000137  062566                       JMP     @#CPSPUR                ;IF NEITHER THEN REPORT
1263                                                                                ;UNEXPECTED TRAP TO 4.
1264
1265  002422  011637  001236                1$:    MOV     (SP),@#$TMP2
1266  002426  022626                               CMP     (SP)+,(SP)+
1267  002430  104004                         15$:  ERROR   4
1268  002432  000404                               BR      ADONE
1269
1270  002434  011637  001236                2$:    MOV     (SP),@#$TMP2
```

```
1271  002440  022626                    CMP     (SP)+,(SP)+
1272  002442  104004            25$:    ERROR   4
1273
1274  002444                    ADONE:
1275  002444  104413                    RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
1276                                                            ;SEE IF THE USER HAS EXPRESSED
1277                                                            ;THE DESIRE TO CHANGE THE SOFTWARE
1278                                                            ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
1279                                                            ;THE USER TYPED CONTROL G?).
1280
1281
1282                              ;;************************************************************
1283                              ;*TEST 2         CFCC TEST
1284                              ;*
1285                              ;*THIS IS A TEST OF THE COPY CONDITION CODES INSTRUCTION, CFCC.
1286                              ;*
1287                              ;;************************************************************
1288  002446  000004              TST2:   SCOPE
1289  002450  104414                      LPERR                  ;SET UP THE LOOP ON ERROR ADDRESS.
1290  002452  012700  000017              MOV     #17,R0                  ;R0 CONTAINS TO TEST PATTERN.
1291
1292  002456                    B1:
1293  002456  170100                      LDFPS   R0                      ;LOAD THE TEST PATTERN
1294
1295  002460                    B2:
1296  002460  170000                      CFCC                            ;COPY CONDITION CODES.
1297
1298  002462  013703  177776              MOV     @#PSW,R3                ;SEE IF PATTERN TRANSFERED.
1299  002466  042703  177760              BIC     #177760,R3
1300  002472  020003                      CMP     R0,R3
1301  002474  001002                      BNE     BERR
1302
1303  002476  077011              B3:     SOB     R0,B1
1304  002500  000422                      BR      BDONE
1305
1306  002502                    BERR:
1307  002502  170201                      STFPS   R1                      ;WAS FPS MODIFIED BY CFCC?
1308  002504  012737  002460  001236      MOV     #B2,@#$TMP2
1309
1310  002512  020001                      CMP     R0,R1
1311  002514  001006                      BNE     BERR1
1312
1313  002516  010337  001240              MOV     R3,@#$TMP3
1314  002522  010037  001242              MOV     R0,@#$TMP4
1315  002526  104001              1$:     ERROR   1
1316  002530  000762                      BR      B3
1317
1318  002532                    BERR1:
1319  002532  010037  001240              MOV     R0,@#$TMP3
1320  002536  010137  001242              MOV     R1,@#$TMP4
1321  002542  104001              1$:     ERROR   1
1322  002544  000754                      BR      B3
1323
1324  002546                    BDONE:
1325  002546  104413                      RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
1326                                                            ;SEE IF THE USER HAS EXPRESSED
```

```
                                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                        ;THE USER TYPED CONTROL G?).

                                        ;;**************************************************************************
                                        ;*TEST 3         SETF, SETD, SETI AND SETL TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE SETF, SETD, SETI AND SETL INSTRUCTIONS.
                                        ;*EACH INSTRUCTION IS EXECUTED WITH THE FPS CONTAINING
                                        ;*ALL ONES AND ALSO WITH THE FPS CLEAR. THE RESULT OF EACH
                                        ;* SITUATION IS CHECKED.
                                        ;*$TEMP2 CONTAINS INSTRUCTION TRIED TO PERFORM
                                        ;*$BDDAT CONTAINS BAD FPS CONTAIN.

                                        ;;**************************************************************************
002550  000004                  TST3:   SCOPE
002552  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
002554  012737  000760  001244          MOV     #760,@#$TMP5
002562  012737  000202  001250  C1:     MOV     #202,@#$TMP7
002570  005000                          CLR     R0

002572  170100                          LDFPS   R0                      ;CLEAR THE FPS.
002574  012737  002602  001236          MOV     #C15,@#$TMP2

002602  170001                  C15:    SETF                            ;TEST INSTRUCTION.

002604  170201                          STFPS   R1                      ;GET RESULT.
002606  005002                          CLR     R2
002610  020201                          CMP     R2,R1                   ;DID AN ERROR OCCUR?
002612  001403                          BEQ     1$
002614  010137  001126                  MOV     R1,@#$BDDAT     ;STORE BAD DATA
002620  104001                          ERROR   1

002622                          1$:
002622  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
002624  012700  147757          C2:     MOV     #147757,R0

002630  170100                          LDFPS   R0                      ;PUT 147757 IS FPS
002632  012737  002640  001236          MOV     #C25,@#$TMP2
002640  170001                  C25:    SETF                            ;CLEAR FD BIT.

002642  170201                          STFPS   R1                      ;GET RESULT
002644  012702  147557                  MOV     #147557,R2
002650  020102                          CMP     R1,R2                   ;RESULT CORRECT.
002652  001403                          BEQ     1$
002654  010137  001126                  MOV     R1,@#$BDDAT     ;STORE BAD DATA
002660  104001                          ERROR   1

002662                          1$:
002662  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
002664  012737  000203  001250  C3:     MOV     #203,@#$TMP7
002672  012700  147757                  MOV     #147757,R0

002676  170100                          LDFPS   R0                      ;LOAD 147757 INTO FPS.
002700  012737  002706  001236          MOV     #C35,@#$TMP2
002706  170011                  C35:    SETD                            ;SETD FD BIT.
```

```
1383
1384  002710  170201                          STFPS   R1
1385  002712  012702  147757                  MOV     #147757,R2
1386  002716  020102                          CMP     R1,R2                   ;RESULT CORRECT?
1387  002720  001403                          BEQ     1$
1388  002722  010137  001126                  MOV     R1,@#$BDDAT     ;STORE BAD DATA
1389  002726  104001                          ERROR   1
1390
1391  002730                          1$:
1392  002730  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1393  002732  005000                  C4:     CLR     R0
1394  002734  170100                          LDFPS   R0                      ;CLEAR FPS.
1395  002736  012737  002744  001236          MOV     #C45,@#$TMP2
1396
1397  002744  170011                  C45:    SETD                            ;SET FD BIT.
1398
1399  002746  170201                          STFPS   R1                      ;GET RESULT.
1400  002750  012702  000200                  MOV     #200,R2
1401  002754  020102                          CMP     R1,R2                   ;RESULT CORRECT?
1402  002756  001403                          BEQ     1$
1403  002760  010137  001126                  MOV     R1,@#$BDDAT     ;STORE BAD DATA
1404  002764  104001                          ERROR   1
1405
1406  002766                          1$:
1407  002766  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1408  002770  012737  000204  001250  C5:     MOV     #204,@#$TMP7
1409  002776  005000                          CLR     R0
1410
1411  003000  170100                          LDFPS   R0                      ;CLEAR FPS
1412  003002  012737  003010  001236          MOV     #C55,@#$TMP2
1413
1414  003010  170002                  C55:    SETI                            ;CLEAR FL BIT.
1415
1416  003012  170201                          STFPS   R1                      ;GET RESULT.
1417  003014  005002                          CLR     R2
1418  003016  020201                          CMP     R2,R1                   ;RESULT CORRECT?
1419  003020  001403                          BEQ     1$
1420  003022  010137  001126                  MOV     R1,@#$BDDAT     ;STORE BAD DATA
1421  003026  104001                          ERROR   1
1422
1423  003030                          1$:
1424  003030  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1425  003032  012700  147757                  MOV     #147757,R0
1426  003036  170100                          LDFPS   R0                      ;PUT 147757 INTO FPS
1427  003040  012737  003046  001236          MOV     #C65,@#$TMP2
1428
1429  003046  170002                  C65:    SETI                            ;CLEAR FL BIT.
1430
1431  003050  170201                          STFPS   R1                      ;GET THE RESULT.
1432  003052  012702  147657                  MOV     #147657,R2
1433  003056  020102                          CMP     R1,R2                   ;RESULT CORRECT?
1434  003060  001403                          BEQ     1$
1435  003062  010137  001126                  MOV     R1,@#$BDDAT     ;STORE BAD DATA
1436  003066  104001                          ERROR   1
1437
1438  003070                          1$:
```

```
1439  003070  104414                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1440  003072  012737  000205  001250  C7:     MOV     #205,@#$TMP7
1441  003100  012700  147757          MOV     #147757,R0
1442  003104  170100                  LDFPS   R0              ;SET FPS TO 147757.
1443  003106  012737  003114  001236  MOV     #C75,@#$TMP2
1444
1445  003114  170012                  C75:    SETL                    ;SET FL BIT.
1446
1447  003116  170201                  STFPS   R1              ;GET THE RESULT.
1448  003120  012702  147757          MOV     #147757,R2
1449  003124  020102                  CMP     R1,R2           ;RESULT CORRECT?
1450  003126  001403                  BEQ     1$
1451  003130  010137  001126          MOV     R1,@#$BDDAT     ;STORE BAD DATA
1452  003134  104001                  ERROR   1
1453
1454  003136                          1$:
1455  003136  104414                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1456  003140  005000                  C8:     CLR     R0
1457  003142  170100                  LDFPS   R0              ;CLEAR FPS.
1458  003144  012737  003152  001236  MOV     #C85,@#$TMP2
1459
1460  003152  170012                  C85:    SETL                    ;SET FL BIT.
1461
1462  003154  170201                  STFPS   R1
1463  003156  012702  000100          MOV     #100,R2
1464  003162  020102                  CMP     R1,R2           ;RESULT CORRECT.
1465  003164  001403                  BEQ     1$
1466  003166  010137  001126          MOV     R1,@#$BDDAT     ;STORE BAD DATA
1467  003172  104001                  ERROR   1
1468
1469  003174                          1$:
1470  003174                          CDONE:
1471  003174  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
1472                                                                  ;SEE IF THE USER HAS EXPRESSED
1473                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
1474                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
1475                                                                  ;THE USER TYPED CONTROL G?).
1476
1477
1478                                  ;;*******************************************************************
1479                                  ;*TEST 4         ILLEGAL FPP OP CODES AND STST TEST
1480                                  ;*
1481                                  ;*THIS IS A TEST OF THE FPP OPERATION CODES:
1482                                  ;*                      170003
1483                                  ;*                      170004
1484                                  ;*                        :
1485                                  ;*                      170010
1486                                  ;*                      170013
1487                                  ;*                      170014
1488                                  ;*                        :
1489                                  ;*                      170077
1490                                  ;*THESE ARE ILLEGAL INSTRUCTIONS AND (WITH INTERRUPTS ENABLED)
1491                                  ;*SHOULD CAUSE A TRAP TO 244.
1492                                  ;*ALSO TESTED HERE IS THE INSTRUCTION:
1493                                  ;*              STST    R1
1494                                  ;*WHICH SHOULD PUT THE FEC CODE 2 IN R1, AFTER ANY OF THE ABOVE
```

```
                                ;*OP CODES IS EXECUTED.
                                ;*
                                ;;*****************************************************************
003176  000004                  TST4:   SCOPE
003200  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
003202  012705  170003                  MOV     #170003,R5              ;INITIAL OP CODE.
003206  012737  003412  000004          MOV     #DERR2,@#ERRVECT
003214  012737  003316  000244          MOV     #DERR1,@#FPVECT

003222  005000                  D1:     CLR     R0
003224  170100                          LDFPS   R0                      ;CLEAR FPS.
003226  005002                          CLR     R2
003230  010537  003246                  MOV     R5,@#D2                 ;SET UP THE ILLEGAL INSTRUCTION.
003234  010537  001244                  MOV     R5,@#$TMP5
003240  012737  003246  001236          MOV     #D2,@#$TMP2
003246  000000                  D2:     .WORD   0
003250  170000                  D3:     CFCC
003252  005202                          INC     R2
003254  005202                  D4:     INC     R2

003256  170201                          STFPS   R1                      ;REPORT FAILURE. DID NOT TRAP.
003260  010137  001240                  MOV     R1,@#$TMP3
003264  104001                  1$:     ERROR   1

003266  022705  170010          D5:     CMP     #170010,R5              ;COMPUTE NEXT OP CODE
003272  001003                          BNE     D6
003274  012705  170013                  MOV     #170013,R5
003300  000750                          BR      D1

003302  022705  170077          D6:     CMP     #170077,R5
003306  001001                          BNE     D7
003310  000452                          BR      DDONE
003312  005205                  D7:     INC     R5
003314  000742                          BR      D1

003316  022716  003250          DERR1:  CMP     #D3,(SP)                ;DID TRAP OCCUR ON TEST INSTRUCTION?
003322  001402                          BEQ     1$
003324  000137  062534                  JMP     @#FPSPUR

003330  022626                  1$:     CMP     (SP)+,(SP)+
003332  170201                          STFPS   R1                      ;GET THE FPS AND SEE IF IT IS
003334  022701  100000                  CMP     #100000,R1              ;SET CORRECTLY.
003340  001406                          BEQ     3$

003342  012737  100000  001240          MOV     #100000,@#$TMP3
003350  010137  001242                  MOV     R1,@#$TMP4
003354  104001                  2$:     ERROR   1

003356  012704  000001          3$:     MOV     #1,R4
003362  170304                  D8:     STST    R4                      ;GET THE FEC CODE. NOTE THAT
                                                                        ;IF THE DESTINATION MODE IS
                                                                        ;IMPROPERLY DECODED AN ODD
                                                                        ;ADDRESS TRAP TO 4 SHOULD OCCUR.
003364  022704  000002                  CMP     #2,R4                   ;WAS FEC CORRECT?
003370  001001                          BNE     D9
003372  000735                          BR      D5
```

```
1551
1552  003374                                  D9:                                     ;REPORT STST FAILURE
1553  003374  012737  003362  001240                MOV     #D8,@#$TMP3
1554  003402  010437  001242                      MOV     R4,@#$TMP4
1555  003406  104001                         1$:   ERROR   1
1556  003410  000726                               BR      D5
1557
1558  003412  022716  003364                DERR2:  CMP     #D8+2,(SP)              ;DID THE TRAP OCCUR ON THE
1559  003416  001402                               BEQ     D10                     ;STST INSTRUCTION?
1560  003420  000137  062566                       JMP     @#CPSPUR
1561
1562  003424                                  D10:
1563  003424  011637  001236                       MOV     (SP),@#$TMP2
1564  003430  022626                               CMP     (SP)+,(SP)+
1565  003432  104001                         1$:   ERROR   1
1566  003434  000714                               BR      D5
1567
1568  003436                                  DDONE:
1569  003436  104413                               RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
1570                                                                          ;SEE IF THE USER HAS EXPRESSED
1571                                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
1572                                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
1573                                                                          ;THE USER TYPED CONTROL G?).
1574
1575
1576                                  ;;**********************************************************************
1577                                  ;*TEST 5        FID, INTERRUPT DISABLE, BIT TEST
1578                                  ;*
1579                                  ;*THIS IS A TEST OF FPS BIT 14 (FID) OR FLOATING INTERRUPT DISABLE.
1580                                  ;*AN ILLEGAL INSTRUCTION IS EXECUTED WITH FID=1. NO INTERRUPT SHOULD
1581                                  ;*OCCUR.
1582                                  ;*
1583                                  ;;**********************************************************************
1584  003440  000004                  TST5:   SCOPE
1585  003442  104414                         LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
1586  003444  012737  003546  000244         MOV     #EERR2,@#FPVECT         ;SETUP FOR THE INTERRUPT.
1587
1588  003452  012700  040000         E1:     MOV     #40000,R0
1589  003456  170100                         LDFPS   R0                      ;SET FID.
1590  003460  012737  003466  001236         MOV     #E3,@#$TMP2
1591  003466                          E2:
1592  003466  170020                 E3:     .WORD   170020                  ;ILLEGAL FPP INSTRUCTION.
1593  003470  170000                 E4:     CFCC
1594
1595  003472  170201                         STFPS   R1                      ;SEE IF ERROR WAS DETECTED.
1596  003474  022701  140000                 CMP     #140000,R1
1597  003500  001005                         BNE     EERR0
1598
1599  003502  170304                         STST    R4                      ;SEE IF FEC=2
1600  003504  022704  000002                 CMP     #2,R4
1601  003510  001010                         BNE     EERR1
1602  003512  000431                         BR      EDONE
1603
1604  003514                          EERR0:                                  ;REPORT FPS INCORRECTLY SET.
1605  003514  010137  001240                 MOV     R1,@#$TMP3
1606  003520  012737  140000  001242         MOV     #140000,@#$TMP4
```

```
1607  003526  104001                  1$:     ERROR   1
1608  003530  000422                          BR      EDONE
1609
1610  003532                          EERR1:                                  ;REPORT FEC NOT 2.
1611  003532  010537  001240                  MOV     R5,@#$TMP3
1612  003536  010437  001242                  MOV     R4,@#$TMP4
1613  003542  104001                  1$:     ERROR   1
1614  003544  000414                          BR      EDONE
1615
1616  003546  021627  003470          EERR2:  CMP     (SP),#E4                ;DID THE ILLEGAL INSTRUCTION TRAP?
1617  003552  001402                          BEQ     1$
1618  003554  000137  062534                  JMP     @#FPSPUR
1619
1620  003560                          1$:
1621  003560  011637  001236                  MOV     (SP),@#$TMP2
1622  003564  022626                          CMP     (SP)+,(SP)+
1623  003566  170201                          STFPS   R1
1624  003570  010137  001240                  MOV     R1,@#$TMP3
1625  003574  104001                  2$:     ERROR   1
1626
1627  003576                          EDONE:
1628  003576  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
1629                                                                  ;SEE IF THE USER HAS EXPRESSED
1630                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
1631                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
1632                                                                  ;THE USER TYPED CONTROL G?).
1633
1634
1635                                  ;;**************************************************************************
1636                                  ;*TEST 6        LDD AND STD, WITH SRC AND DST MODE 1, TEST
1637                                  ;*
1638                                  ;*THIS IS A TEST OF BOTH THE INSTRUCTION:
1639                                  ;*              LDD     (R0),AC0
1640                                  ;*AND THE INSTRUCTION:
1641                                  ;*              STD     AC0,(R0)
1642                                  ;*MOST OF THE FAILURES ARE ISOLATED TO THE SRC OR DST FLOWS. NOTE
1643                                  ;*THAT THE INTEGRITY OF AC0 HAS NOT BEEN ASSURED. THIS MEANS THAT
1644                                  ;*IN SOME CASES IT WILL BE IMPOSSIBLE TO ISOLATE CERTAIN DATA PATTERN
1645                                  ;*FAILURES TO EITHER THE FLOWS OR THIS ACCUMULATOR.
1646                                  ;*
1647                                  ;;**************************************************************************
1648  003600  000004                  TST6:   SCOPE
1649
1650  003602                          F1:
1651  003602  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1652  003604  012737  003654  001236          MOV     #F3,@#$TMP2
1653  003612  005000                          CLR     R0
1654  003614  170100                          LDFPS   R0
1655  003616  170011                          SETD
1656  003620  012701  005372                  MOV     #FDATI0,R1              ;SET UP THE LOAD DATA.
1657  003624  012702  005436                  MOV     #FXDAT0,R2
1658  003630  012703  000010                  MOV     #10,R3
1659
1660  003634  012221                  F2:     MOV     (R2)+,(R1)+
1661  003636  077302                          SOB     R3,F2
1662
```

```
1663  003640  012700  005402                  MOV     #FDATI4,R0              ;SETUP R0 FOR THE LDD (R0),AC0.
1664  003644  012737  005072  000004          MOV     #FERR20,@#ERRVECT       ;IF THE SRC FLOWS FAIL THEN
1665                                                                          ;AN ODD ADDRESS MAY OCCUR.
1666  003652  005003                          CLR     R3
1667
1668  003654  172410                  F3:     LDD     (R0),AC0
1669  003656  005203                  F4:     INC     R3
1670  003660  005203                          INC     R3
1671
1672  003662  020027  005402                  CMP     R0,#FDATI4              ;WAS R0 AFFECTED?
1673  003666  001402                          BEQ     F5
1674  003670  000137  004236                  JMP     @#FERR1
1675
1676  003674  020327  000002          F5:     CMP     R3,#2                   ;SEE IF THE PC WAS ADVERSELY
1677  003700  001402                          BEQ     1$                      ;AFFECTED DURING THE INSTRUCTION.
1678  003702  000137  004334                  JMP     @#FERR2
1679
1680  003706  012701  005372          1$:     MOV     #FDATI0,R1              ;MAKE SURE THE SOURCE DATA WAS
1681  003712  012702  005436                  MOV     #FXDAT0,R2              ;NOT AFFECTED.
1682  003716  012703  000010                  MOV     #10,R3
1683  003722  022122                  2$:     CMP     (R1)+,(R2)+
1684  003724  001402                          BEQ     3$
1685  003726  000137  004200                  JMP     @#FERR0
1686  003732  077305                  3$:     SOB     R3,2$
1687
1688  003734  170201                          STFPS   R1                      ;MAKE SURE THE FPS IS CORRECT.
1689  003736  022701  000200                  CMP     #200,R1
1690  003742  001402                          BEQ     F6
1691  003744  000137  005052                  JMP     @#FERR11
1692
1693  003750                          F6:
1694  003750  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
1695  003752  012737  004014  001236          MOV     #F10,@#$TMP2
1696
1697  003760  012703  177777                  MOV     #-1,R3
1698  003764  012704  000010                  MOV     #10,R4
1699  003770  012705  005414                  MOV     #FDAT00,R5              ;SET UP THE OUTPUT DATA BUFFER.
1700  003774  010325                  F7:     MOV     R3,(R5)+
1701  003776  077402                          SOB     R4,F7
1702
1703  004000  012700  005424                  MOV     #FDATI4,R0              ;SET UP R0 FOR DST MODE 1 REG 0.
1704  004004  012737  005232  000004          MOV     #FERR25,@#ERRVECT       ;IF THE DST FLOWS FAIL AN ODD
1705                                                                          ;ADDRESS COULD OCCUR.
1706  004012  005003                          CLR     R3
1707
1708  004014  174010                  F10:    STD     AC0,(R0)                ;TEST INSTRUCTION.
1709  004016  005203                  F11:    INC     R3
1710  004020  005203                          INC     R3
1711
1712  004022  020027  005424                  CMP     R0,#FDATI4              ;WAS R0 MODIFIED?
1713  004026  001402                          BEQ     F12
1714  004030  000137  004374                  JMP     @#FERR3
1715
1716  004034  020327  000002          F12:    CMP     R3,#2                   ;WAS THE PC AFFECTED CORRECTLY?
1717  004040  001402                          BEQ     F135
1718  004042  000167  000320                  JMP     FERR4
```

```
1719
1720  004046  012701  005414          F135:   MOV     #FDAT00,R1
1721  004052  012702  005436                  MOV     #FXDAT0,R2
1722
1723  004056  022122                  CMP     (R1)+,(R2)+             ;SEE IF THE DATA WAS OUTPUT
1724  004060  001402                  BEQ     F13                     ;TO THE TARGET AREA CORRECTLY.
1725  004062  000137  004472          JMP     @#FERR5
1726
1727  004066  022122          F13:    CMP     (R1)+,(R2)+
1728  004070  001402                  BEQ     F14
1729  004072  000137  004472          JMP     @#FERR5
1730
1731  004076  022122          F14:    CMP     (R1)+,(R2)+
1732  004100  001402                  BEQ     F15
1733  004102  000137  004472          JMP     @#FERR5
1734
1735  004106  022122          F15:    CMP     (R1)+,(R2)+
1736  004110  001402                  BEQ     F16
1737  004112  000137  004472          JMP     @#FERR5
1738
1739  004116  022122          F16:    CMP     (R1)+,(R2)+
1740  004120  001402                  BEQ     F17
1741  004122  000137  005016          JMP     @#FERR10
1742
1743  004126  022122          F17:    CMP     (R1)+,(R2)+
1744  004130  001402                  BEQ     F20
1745  004132  000137  004526          JMP     @#FERR6
1746
1747  004136  022122          F20:    CMP     (R1)+,(R2)+
1748  004140  001402                  BEQ     F21
1749  004142  000167  000514          JMP     FERR7
1750
1751  004146  022122          F21:    CMP     (R1)+,(R2)+
1752  004150  001402                  BEQ     F22
1753  004152  000137  005016          JMP     @#FERR10
1754
1755  004156  005001          F22:    CLR     R1
1756  004160  170201                  STFPS   R1                      ;MAKE SURE FPS IS CORRECT.
1757  004162  022701  000200          CMP     #200,R1
1758  004166  001402                  BEQ     F23
1759  004170  000137  005052          JMP     @#FERR11
1760  004174  000137  005456  F23:    JMP     @#FDONE
1761
1762  004200                  FERR0:                                  ;SOURCE DATA AFFECTED BY
1763  004200  012737  005436  001240          MOV     #FXDAT0,@#$TMP3 ;THE LDD INSTRUCTION.
1764  004206  012737  005450  001242          MOV     #FXDAT0+12,@#$TMP4
1765  004214  012737  005372  001244          MOV     #FDATI0,@#$TMP5
1766  004222  012737  005404  001246          MOV     #FDATI0+12,@#$TMP6
1767  004230  104001          1$:     ERROR   1
1768  004232  000137  005456                  JMP     @#FDONE
1769
1770  004236  012737  005402  001242  FERR1:  MOV     #FDATI4,@#$TMP4         ;FSRC FLOWS FAILURE.
1771  004244  010037  001240                  MOV     R0,@#$TMP3
1772  004250  012737  000762  001244          MOV     #762,@#$TMP5
1773  004256  012737  000321  001250          MOV     #321,@#$TMP7
1774
```

```
1775  004264  022700  005372          CMP     #FDATI0,R0              ;FSRC MODE 4?
1776  004270  001004                  BNE     1$
1777  004272  012737  000324  001246  MOV     #324,@#$TMP6
1778  004300  000412                  BR      4$
1779
1780  004302  022700  005412    1$:   CMP     #FDATI4+10,R0           ;FSRC MODE 2?
1781  004306  001004                  BNE     2$
1782  004310  012737  000322  001246  MOV     #322,@#$TMP6
1783  004316  000403                  BR      4$
1784
1785  004320                    2$:
1786  004320                    3$:
1787  004320  104001                  ERROR   1                       ;R0 WAS MODIFED, LDD
1788  004322  000137  005456          JMP     @#FDONE
1789  004326                    4$:
1790  004326                    5$:
1791  004326  104001                  ERROR   1                       ;R0 WAS MODIFED, LDD
1792  004330  000137  005456          JMP     @#FDONE
1793
1794
1795  004334  012701  003656  FERR2:  MOV     #F4,R1                  ;THE PC WAS INCORRECTLY AFFECTED
1796                                                                  ;DURING THE INSTRUCTION.
1797  004340  010137  001242  FER2:   MOV     R1,@#$TMP4
1798  004344  162701  000004          SUB     #4,R1
1799  004350  006303                  ASL     R3
1800  004352  060301                  ADD     R3,R1
1801  004354  010137  001240          MOV     R1,@#$TMP3
1802  004360  104001            1$:   ERROR   1
1803  004362  000137  005456          JMP     @#FDONE
1804
1805  004366  012701  004016  FERR4:  MOV     #F11,R1
1806  004372  000762                  BR      FER2
1807
1808  004374  012737  005424  001242  FERR3:  MOV     #FDAT04,@#$TMP4         ;FAILURE IN THE FDST FLOWS.
1809  004402  010037  001240          MOV     R0,@#$TMP3
1810  004406  012737  000527  001244  MOV     #527,@#$TMP5
1811  004414  012737  000641  001250  MOV     #641,@#$TMP7
1812
1813  004422  022700  005414          CMP     #FDAT00,R0              ;DST MODE 4?
1814  004426  001004                  BNE     1$
1815  004430  012737  000644  001246  MOV     #644,@#$TMP6
1816  004436  000412                  BR      4$
1817
1818  004440  022700  005434    1$:   CMP     #FDAT04+10,R0           ;DST MODE 2?
1819  004444  001004                  BNE     2$
1820  004446  012737  000642  001246  MOV     #642,@#$TMP6
1821  004454  000403                  BR      4$
1822
1823  004456                    2$:
1824  004456  104001            3$:   ERROR   1                       ;R0 WAS MODIFIED, STD
1825  004460  000137  005456          JMP     @#FDONE
1826
1827  004464                    4$:
1828  004464  104001            5$:   ERROR   1                       ;R0 WAS MODIFIED, STD
1829
1830  004466  000137  005456          JMP     @#FDONE
```

```
1831
1832  004472                                FERR5:                                  ;FAILURE OF STD.
1833  004472  010037  001240                        MOV     R0,@#$TMP3
1834  004476  012737  005414  001242                MOV     #FDAT00,@#$TMP4
1835  004504  012737  005432  001244                MOV     #FDAT07,@#$TMP5
1836  004512  012737  005436  001246                MOV     #FXDAT0,@#$TMP6
1837  004520  104003                        1$:     ERROR   3                       ;OUTPUT BAD, STD
1838  004522  000137  005456                        JMP     @#FDONE
1839
1840  004526  012701  005426                FERR6:  MOV     #FDAT05,R1              ;DID (BUT GR7) FAIL IN THE FDST
1841  004532  012702  177777                        MOV     #-1,R2                  ;FLOWS?
1842  004536  012703  000003                        MOV     #3,R3
1843  004542  020221                        1$:     CMP     R2,(R1)+
1844  004544  001017                                BNE     5$
1845  004546  077303                                SOB     R3,1$
1846
1847                                                                                ;REPORT FAILURE OF (BUT GR7) IN
1848  004550  010037  001240                        MOV     R0,@#$TMP3              ;THE FDST FLOWS.
1849  004554  012737  000412  001244                MOV     #412,@#$TMP5
1850  004562  012737  000147  001246                MOV     #147,@#$TMP6
1851  004570  012737  000145  001250                MOV     #145,@#$TMP7
1852  004576  104001                        2$:     ERROR   1
1853  004600  000137  005456                        JMP     @#FDONE
1854
1855  004604  012701  005426                5$:     MOV     #FDAT05,R1              ;DID (BUT GR7) FAIL IN THE SRC FLOWS?
1856  004610  012703  000003                        MOV     #3,R3
1857  004614  005721                        6$:     TST     (R1)+
1858  004616  001402                                BEQ     7$
1859  004620  000137  005016                        JMP     @#FERR10
1860  004624  077305                        7$:     SOB     R3,6$
1861
1862                                                                                ;REPORT FAILURE OF (BUT GR7) IN
1863  004626  010037  001240                        MOV     R0,@#$TMP3              ;THE FSRC FLOWS.
1864  004632  012737  000207  001244                MOV     #207,@#$TMP5
1865  004640  012737  000176  001246                MOV     #176,@#$TMP6
1866  004646  012737  000174  001250                MOV     #174,@#$TMP7
1867
1868  004654  104001                        10$:    ERROR   1
1869  004656  000137  005456                        JMP     @#FDONE
1870
1871  004662  012701  005430                FERR7:  MOV     #FDAT06,R1              ;DID (BUT FD) FAIL IN THE FDST FLOWS?
1872  004666  012702  177777                        MOV     #-1,R2
1873  004672  012703  000002                        MOV     #2,R3
1874  004676  020221                        1$:     CMP     R2,(R1)+
1875  004700  001017                                BNE     5$
1876  004702  077303                                SOB     R3,1$
1877
1878                                                                                ;REPORT FAILURE OF (BUT FD) IN THE
1879  004704  010037  001240                        MOV     R0,@#$TMP3              ;FDST FLOWS.
1880  004710  012737  000707  001244                MOV     #707,@#$TMP5
1881  004716  012737  000244  001246                MOV     #244,@#$TMP6
1882  004724  012737  000245  001250                MOV     #245,@#$TMP7
1883  004732  104001                        2$:     ERROR   1
1884  004734  000137  005456                        JMP     @#FDONE
1885
1886  004740  012701  005430                5$:     MOV     #FDAT06,R1              ;DID (BUT FD) FAIL IN THE FSRC FLOWS?
```

```
 1887  004744  012703  000002                MOV     #2,R3
 1888  004750  005721              6$:       TST     (R1)+
 1889  004752  001402                        BEQ     7$
 1890  004754  000137  005016                JMP     @#FERR10
 1891  004760  077305              7$:       SOB     R3,6$
 1892
 1893                                                      ;REPORT FAILURE OF (BUT FD) IN THE
 1894  004762  010037  001240                MOV     R0,@#$TMP3        ;FSRC FLOWS.
 1895  004766  012737  000441  001244        MOV     #441,@#$TMP5
 1896  004774  012737  000076  001246        MOV     #76,@#$TMP6
 1897  005002  012737  000077  001250        MOV     #77,@#$TMP7
 1898  005010  104003              10$:      ERROR   3                 ;BAD DATA
 1899  005012  000137  005456                JMP     @#FDONE
 1900
 1901  005016                    FERR10:                               ;REPORT DATA ERROR.
 1902  005016  010037  001240                MOV     R0,@#$TMP3
 1903  005022  012737  005424  001242        MOV     #FDAT04,@#$TMP4
 1904  005030  012737  005432  001244        MOV     #FDAT07,@#$TMP5
 1905  005036  012737  005446  001246        MOV     #FXDAT4,@#$TMP6
 1906  005044  104001              1$:       ERROR   1
 1907  005046  000137  005456                JMP     @#FDONE
 1908
 1909  005052                    FERR11:                               ;REPORT BAD FPS.
 1910  005052  010137  001240                MOV     R1,@#$TMP3
 1911  005056  012737  000200  001242        MOV     #200,@#$TMP4
 1912  005064  104001              1$:       ERROR   1
 1913  005066  000137  005456                JMP     @#FDONE
 1914
 1915  005072  012737  062745  001264  FERR20: MOV     #NULL,@#$TMP15    ;THE EXECUTION OF THE LDD
 1916  005100  005037  001252                CLR     @#$TMP10          ;CAUSED A TRAP TO 4, BECAUSE
 1917  005104  011637  001236                MOV     (SP),@#$TMP2      ;A FSRC FLOW FAILURE RESULTED
 1918  005110  012737  005402  001240        MOV     #FDATI4,@#$TMP3   ;IN AN ODD ADDRESS.
 1919  005116  012737  000321  001250        MOV     #321,@#$TMP7
 1920  005124  012737  000762  001244        MOV     #762,@#$TMP5
 1921
 1922  005132  021627  003660                CMP     (SP),#F4+2        ;SEE IF FSRC MODE 6 OR 7 WAS
 1923  005136  001424                        BEQ     FERR21            ;EXECUTED.
 1924
 1925  005140  020027  005400                CMP     R0,#FDATI3        ;FSRC MODE 5?
 1926  005144  001006                        BNE     2$
 1927
 1928                                                      ;REPORT FSRC FLOW FAILURE TO
 1929  005146  012737  000325  001246        MOV     #325,@#$TMP6      ;MODE 5.
 1930  005154  022626                        CMP     (SP)+,(SP)+
 1931  005156  104001              1$:       ERROR   1
 1932  005160  000536                        BR      FDONE
 1933
 1934  005162  020027  005404          2$:   CMP     R0,#FDATI5        ;FSRC MODE 3?
 1935  005166  001402                        BEQ     3$
 1936  005170  000137  062566                JMP     @#CPSPUR
 1937
 1938  005174                            3$:                           ;REPORT FSRC     FLOW FAILURE TO
 1939  005174  012737  000323  001246        MOV     #323,@#$TMP6      ;MODE 3.
 1940  005202  022626                        CMP     (SP)+,(SP)+
 1941  005204  104001              4$:       ERROR   1
 1942  005206  000523                        BR      FDONE
```

```
1943
1944  005210  022626                    FERR21: CMP     (SP)+,(SP)+             ;REPORT FSRC FLOW FAILURE TO
1945                                                                            ;MODE 6 OR MODE 7.
1946  005212  012737  000326  001246            MOV     #326,@#$TMP6
1947  005220  012737  000327  001252            MOV     #327,@#$TMP10
1948  005226  104001                    1$:     ERROR   1
1949  005230  000512                            BR      FDONE
1950
1951  005232  012737  062745  001264    FERR25: MOV     #NULL,@#$TMP15          ;THE EXECUTION OF THE STD INSTRUCTION
1952  005240  005037  001252                    CLR     @#$TMP10                ;TRAPPED TO 4, BECAUSE A FAILURE
1953  005244  012737  005424  001240            MOV     #FDAT04,@#$TMP3         ;IN THE FDST FLOWS RESULTED
1954  005252  011637  001236                    MOV     (SP),@#$TMP2            ;IN AN ODD ADDRESS.
1955  005256  012737  000527  001244            MOV     #527,@#$TMP5
1956  005264  012737  000641  001250            MOV     #641,@#$TMP7
1957
1958  005272  021627  004016                    CMP     (SP),#F10+2             ;FLOW FAILURE TO FDST MODE 6 OR 7?
1959  005276  001424                            BEQ     FERR26
1960
1961  005300  020027  005422                    CMP     R0,#FDAT03              ;DID FDST FLOW FAIL TO MODE 5?
1962  005304  001006                            BNE     2$
1963
1964                                                                            ;REPORT FLOW FAILURE TO FDST
1965  005306  012737  000645  001246            MOV     #645,@#$TMP6            ;MODE 5.
1966  005314  022626                            CMP     (SP)+,(SP)+
1967  005316  104001                    1$:     ERROR   1
1968  005320  000456                            BR      FDONE
1969
1970  005322  020027  005426            2$:     CMP     R0,#FDAT05              ;DID FDST FLOW FAIL TO MODE 3?
1971  005326  001402                            BEQ     3$
1972  005330  000137  062566                    JMP     @#CPSPUR
1973
1974  005334                            3$:                                     ;REPORT FDST FLOW FAILED TO MODE 3.
1975  005334  012737  000643  001246            MOV     #643,@#$TMP6
1976  005342  022626                            CMP     (SP)+,(SP)+
1977  005344  104001                    4$:     ERROR   1
1978  005346  000443                            BR      FDONE
1979
1980  005350                            FERR26:                                 ;REPORT FDST FLOW FAILURE TO MODE
1981  005350  012737  000646  001246            MOV     #646,@#$TMP6
1982  005356  012737  000647  001252            MOV     #647,@#$TMP10
1983  005364  022626                            CMP     (SP)+,(SP)+
1984  005366  104001                    1$:     ERROR   1
1985  005370  000432                            BR      FDONE
1986
1987  005372  177777                    FDATI0: -1
1988  005374  177777                    FDATI1: -1
1989  005376  177777                    FDATI2: -1
1990  005400  177777                    FDATI3: -1
1991  005402  177777                    FDATI4: -1
1992  005404  177777                    FDATI5: -1
1993  005406  177777                    FDATI6: -1
1994  005410  177777                    FDATI7: -1
1995  005412  177777                            -1
1996  005414  177777                    FDAT00: -1
1997  005416  177777                    FDAT01: -1
1998  005420  177777                    FDAT02: -1
```

```
 1999  005422  177777                  FDAT03: -1
 2000  005424  177777                  FDAT04: -1
 2001  005426  177777                  FDAT05: -1
 2002  005430  177777                  FDAT06: -1
 2003  005432  177777                  FDAT07: -1
 2004  005434  177777                          -1
 2005  005436  177777                  FXDAT0: -1
 2006  005440  177777                  FXDAT1: -1
 2007  005442  177777                  FXDAT2: -1
 2008  005444  177777                  FXDAT3: -1
 2009  005446  052525                  FXDAT4: 052525
 2010  005450  031463                  FXDAT5: 031463
 2011  005452  007417                  FXDAT6: 007417
 2012  005454  000477                  FXDAT7: 000477
 2013
 2014
 2015  005456                          FDONE:
 2016  005456  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 2017                                                                  ;SEE IF THE USER HAS EXPRESSED
 2018                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 2019                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 2020                                                                  ;THE USER TYPED CONTROL G?).
 2021
 2022
 2023                                  ;;**************************************************************
 2024                                  ;*TEST 7        FSRC MODE 0 TEST
 2025                                  ;*
 2026                                  ;*THIS IS A TEST OF FSRC MODE ZERO USING THE LDD AND LDF INSTRUCTIONS.
 2027                                  ;*
 2028                                  ;;**************************************************************
 2029  005460  000004                  TST7:   SCOPE
 2030  005462  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 2031
 2032  005464                          I1:
 2033  005464  170011                          SETD                    ;SET FD.
 2034  005466  012700  006274                  MOV     #IDAT10,R0
 2035  005472  012701  006244                  MOV     #IPAT10,R1
 2036  005476  012702  000004                  MOV     #4,R2
 2037  005502  012120                  I2:     MOV     (R1)+,(R0)+     ;SET UP THE INPUT DATA BUFFER.
 2038  005504  077202                          SOB     R2,I2
 2039
 2040  005506  012700  006274                  MOV     #IDAT10,R0      ;LOAD AC1
 2041  005512  172510                          LDD     (R0),AC1
 2042
 2043  005514  012700  006254                  MOV     #IPAT20,R0      ;LOAD AC0
 2044  005520  172410                          LDD     (R0),AC0
 2045
 2046  005522  012701  000001                  MOV     #1,R1           ;IN CASE THE FSRC FLOWS FAIL
 2047  005526  012737  006044  000004          MOV     #IERR0,@#ERRVECT ;AN ODD ADDRESS TRAP TO 4 MAY OCCUR.
 2048  005534  012737  005542  001236          MOV     #I3,@#$TMP2
 2049  005542  172401                  I3:     LDD     AC1,AC0         ;TEST INSTRUCTION.
 2050  005544  000240                  I4:     NOP
 2051  005546  000240                  I5:     NOP
 2052
 2053  005550  012700  006264                  MOV     #IDAT00,R0
 2054  005554  174010                          STD     AC0,(R0)        ;GET AC0, THE RESULTS.
```

```
2055
2056  005556  012700  006264            MOV     #IDAT00,R0              ;SEE IF DATA IS CORRECT.
2057  005562  012701  006274            MOV     #IDAT10,R1
2058  005566  012702  000004            MOV     #4,R2
2059  005572  022021              I6:    CMP     (R0)+,(R1)+
2060  005574  001424                     BEQ     I105
2061
2062  005576  012700  006270            MOV     #IDAT02,R0              ;SEE IF (BUT FD) FAILED.
2063  005602  012702  000002            MOV     #2,R2
2064  005606  005720              I7:    TST     (R0)+
2065  005610  001413                     BEQ     I10
2066
2067  005612  012700  006270            MOV     #IDAT02,R0
2068  005616  012702  000002            MOV     #2,R2
2069  005622  022720  177777      1$:    CMP     #-1,(R0)+
2070  005626  001402                     BEQ     2$
2071  005630  000137  006126            JMP     @#IERR1
2072  005634  077206              2$:    SOB     R2,1$
2073  005636  000401                     BR      I106
2074  005640  077216              I10:   SOB     R2,I7
2075  005642  000137  006146      I106:  JMP     @#IERR2
2076
2077  005646  077227              I105:  SOB     R2,I6
2078
2079                              ;NOW TEST THE LOAD INSTRUCTION WITH FSRC MODE ZERO AND FD CLEAR.
2080
2081  005650                      I111:
2082  005650  104414                     LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
2083
2084  005652  012700  006244      I12:   MOV     #IPAT10,R0
2085  005656  012701  006274            MOV     #IDAT10,R1
2086  005662  012702  000004            MOV     #4,R2
2087  005666  012021              I13:   MOV     (R0)+,(R1)+
2088  005670  077202                     SOB     R2,I13
2089
2090  005672  012700  006274            MOV     #IDAT10,R0              ;SET UP AC1
2091  005676  172510                     LDD     (R0),AC1
2092
2093  005700  012700  006254            MOV     #IPAT20,R0              ;SET UP AC0
2094  005704  172410                     LDD     (R0),AC0
2095
2096  005706  012701  000001            MOV     #1,R1
2097  005712  012737  005722  001236     MOV     #I14,@#$TMP2
2098  005720  170001                     SETF                            ;CLEAR FD.
2099
2100  005722  172401              I14:   LDF     AC1,AC0                 ;TEST INSTRUCTION.
2101  005724  000240              I15:   NOP
2102  005726  000240              I16:   NOP
2103
2104  005730  170200                     STFPS   R0                      ;SEE IF FPS IS STILL CLEAR.
2105  005732  022700  000004            CMP     #4,R0
2106  005736  001402                     BEQ     I17
2107  005740  000137  006220            JMP     @#IERR3
2108
2109  005744              I17:                                            ;RESET TO DOUBLE MODE.
2110  005744  170011                     SETD
```

```
 2111
 2112  005746  012700  006264                MOV     #IDAT00,R0
 2113  005752  174010                       STD     AC0,(R0)                ;GET AC0
 2114
 2115  005754  012737  177777  006300        MOV     #-1,@#IDATI2
 2116  005762  012737  177777  006302        MOV     #-1,@#IDATI3
 2117  005770  012700  006264               MOV     #IDAT00,R0
 2118  005774  012701  006274               MOV     #IDATI0,R1
 2119  006000  012702  000004               MOV     #4,R2
 2120  006004  022021              I20:     CMP     (R0)+,(R1)+             ;SEE IF AC0 WAS CORRECT.
 2121  006006  001414                       BEQ     I23
 2122
 2123  006010  023737  006270  006250       CMP     @#IDAT02,@#IPAT12       ;DID (BUT FD) FAIL?
 2124  006016  001402                       BEQ     I22
 2125  006020  000137  006126      I21:     JMP     @#IERR1
 2126  006024  023737  006272  006252 I22:  CMP     @#IDAT03,@#IPAT13
 2127  006032  001372                       BNE     I21
 2128  006034  000137  006174               JMP     @#IERR4
 2129
 2130  006040  077217              I23:     SOB     R2,I20
 2131
 2132  006042  000520                       BR      IDONE                   ;NO ERRORS.
 2133
 2134                                       ;IF AN ODD ADDRESS TRAP OCCURS COME HERE TO ANALYZE THE FSRC FAILURE.
 2135  006044  022716  005544      IERR0:   CMP     #I4,(SP)                ;MAKE SURE THE TRAP OCCURRED
 2136  006050  001413                       BEQ     1$                      ;ON THE INSTRUCTION BEING TESTED.
 2137  006052  022716  005546               CMP     #I5,(SP)
 2138  006056  001410                       BEQ     1$
 2139  006060  022716  005724               CMP     #I15,(SP)
 2140  006064  001405                       BEQ     1$
 2141  006066  022716  005726               CMP     #I16,(SP)
 2142  006072  001402                       BEQ     1$
 2143  006074  000137  062566               JMP     @#CPSPUR
 2144
 2145  006100  011637  001236      1$:      MOV     (SP),@#$TMP2            ;REPORT FAILURE.
 2146  006104  012737  000627  001240       MOV     #627,@#$TMP3
 2147  006112  012737  000320  001242       MOV     #320,@#$TMP4
 2148  006120  022626                       CMP     (SP)+,(SP)+
 2149  006122  104001              2$:      ERROR   1
 2150  006124  000467                       BR      IDONE
 2151
 2152                                       ;REPORT DATA ERROR.
 2153  006126                      IERR1:
 2154  006126  012737  006274  001242       MOV     #IDATI0,@#$TMP4
 2155  006134  012737  006264  001244       MOV     #IDAT00,@#$TMP5
 2156  006142  104004              1$:      ERROR   4
 2157  006144  000457                       BR      IDONE
 2158
 2159                                       ;REPORT FAILURE OF (BUT FD)
 2160  006146  012737  000153  001244 IERR2:  MOV     #153,@#$TMP5
 2161  006154  012737  000434  001246       MOV     #434,@#$TMP6
 2162  006162  012737  000435  001250       MOV     #435,@#$TMP7
 2163  006170                      IERR25:
 2164  006170  104001              1$:      ERROR   1
 2165  006172  000444                       BR      IDONE
 2166  006174  012737  000153  001244 IERR4:  MOV     #153,@#$TMP5
```

```
 2167  006202  012737  000435  001246          MOV     #435,@#$TMP6
 2168  006210  012737  000434  001250          MOV     #434,@#$TMP7
 2169  006216  000764                          BR      IERR25
 2170
 2171                                  ;REPORT INCORRECT FPS AFTER LOAD INSTRUCTION.
 2172  006220                          IERR3:
 2173  006220  012737  005722  001236          MOV     #I14,@#$TMP2
 2174  006226  010037  001240                  MOV     R0,@#$TMP3
 2175  006232  012737  000004  001242          MOV     #4,@#$TMP4
 2176  006240  104001                  1$:     ERROR   1
 2177  006242  000420                          BR      IDONE
 2178
 2179
 2180  006244  000000                  IPAT10: 0
 2181  006246  170360                  IPAT11: 170360
 2182  006250  016161                  IPAT12: 016161
 2183  006252  052525                  IPAT13: 052525
 2184
 2185  006254  177777                  IPAT20: -1
 2186  006256  177777                  IPAT21: -1
 2187  006260  177777                  IPAT22: -1
 2188  006262  177777                  IPAT23: -1
 2189
 2190  006264  000000                  IDAT00: 0
 2191  006266  000000                  IDAT01: 0
 2192  006270  000000                  IDAT02: 0
 2193  006272  000000                  IDAT03: 0
 2194
 2195  006274  000000                  IDAT10: 0
 2196  006276  000000                  IDAT11: 0
 2197  006300  000000                  IDAT12: 0
 2198  006302  000000                  IDAT13: 0
 2199
 2200  006304                          IDONE:
 2201  006304  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 2202                                                                  ;SEE IF THE USER HAS EXPRESSED
 2203                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 2204                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 2205                                                                  ;THE USER TYPED CONTROL G?).
 2206
 2207
 2208                                  ;;*********************************************************************
 2209                                  ;*TEST 10       FDST MODE 0 TEST
 2210                                  ;*
 2211                                  ;*THIS IS A TEST OF THE STORE INSTRUCTIONS, STD AND STF,  WITH FDST MODE 0.
 2212                                  ;*
 2213                                  ;;*********************************************************************
 2214  006306  000004                  TST10:  SCOPE
 2215  006310                          T1:
 2216  006310  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 2217  006312  170011                          SETD                            ;SET FD
 2218  006314  012700  007036                  MOV     #TPAT10,R0
 2219  006320  012701  007066                  MOV     #TDAT10,R1
 2220  006324  012702  000004                  MOV     #4,R2
 2221  006330  012021                  T2:     MOV     (R0)+,(R1)+             ;SET UP THE INPUT DATA BUFFER.
 2222  006332  077202                          SOB     R2,T2
```

```
2223
2224  006334  012700  007066          MOV     #TDATI0,R0              ;LOAD AC0
2225  006340  172410                  LDD     (R0),AC0
2226
2227  006342  012700  007046          MOV     #TPAT20,R0              ;LOAD AC1
2228  006346  172510                  LDD     (R0),AC1
2229
2230  006350  012701  000001          MOV     #1,R1                   ;IF THE (BUT FDST) FORK FAILS
2231  006354  012737  006644  000004  MOV     #TERR0,@#ERRVECT        ;AN ODD ADDRESS TRAP COULD RESULT.
2232  006362  012737  006370  001236  MOV     #T3,@#$TMP2
2233  006370  174001          T3:     STD     AC0,AC1
2234  006372  000240          T4:     NOP
2235  006374  000240          T5:     NOP
2236
2237  006376  012700  007056          MOV     #TDAT00,R0
2238  006402  174110                  STD     AC1,(R0)                ;GET THE DATA.
2239
2240  006404  012703  007056          MOV     #TDAT00,R3              ;SEE IF THE DATA IS CORRECT.
2241  006410  012704  007066          MOV     #TDATI0,R4
2242  006414  012705  000004          MOV     #4,R5
2243  006420  022324          T6:     CMP     (R3)+,(R4)+
2244  006422  001413                  BEQ     T105
2245
2246  006424  012703  007062          MOV     #TDAT02,R3              ;DID (BUT FD) FAIL?
2247  006430  012705  000002          MOV     #2,R5
2248  006434  005723          T7:     TST     (R3)+
2249  006436  001402                  BEQ     T10
2250  006440  000137  006726          JMP     @#TERR1
2251  006444  077505          T10:    SOB     R5,T7
2252  006446  000137  006746          JMP     @#TERR2
2253
2254  006452  077516          T105:   SOB     R5,T6
2255
2256                          ;NOW TEST THE STF AC0,AC1 INSTRUCTION.
2257
2258  006454                  T11:
2259  006454  104414                  LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
2260
2261  006456  012700  007036  T12:     MOV     #TPAT10,R0              ;SET UP THE INPUT DATA BUFFER.
2262  006462  012701  007066          MOV     #TDATI0,R1
2263  006466  012702  000004          MOV     #4,R2
2264  006472  012021          T13:    MOV     (R0)+,(R1)+
2265  006474  077202                  SOB     R2,T13
2266
2267  006476  012700  007066          MOV     #TDATI0,R0              ;SET UP AC0
2268  006502  172410                  LDD     (R0),AC0
2269
2270  006504  012700  007046          MOV     #TPAT20,R0              ;SET UP AC1
2271  006510  172510                  LDD     (R0),AC1
2272
2273  006512  012701  000001          MOV     #1,R1
2274  006516  012737  006526  001236  MOV     #T14,@#$TMP2
2275  006524  170001                  SETF                            ;CLEAR FD
2276  006526  174001          T14:    STF     AC0,AC1
2277  006530  000240          T15:    NOP
2278  006532  000240          T16:    NOP
```

```
2279
2280  006534  005000                          CLR     R0
2281  006536  170200                          STFPS   R0                      ;SEE IF FPS IS CLEAR.
2282  006540  022700  000010                  CMP     #10,R0
2283  006544  001401                          BEQ     T17
2284  006546  000521                          BR      TERR3
2285
2286  006550                          T17:
2287  006550  170011                          SETD                            ;SET FD.
2288
2289  006552  012700  007056                  MOV     #TDAT00,R0
2290  006556  174110                          STD     AC1,(R0)                ;PICK UP AC1.
2291
2292  006560  012737  177777  007072          MOV     #-1,@#TDATI2
2293  006566  012737  177777  007074          MOV     #-1,@#TDATI3
2294  006574  012703  007056                  MOV     #TDAT00,R3
2295  006600  012704  007066                  MOV     #TDATI0,R4
2296  006604  012705  000004                  MOV     #4,R5
2297  006610  022324                  T20:    CMP     (R3)+,(R4)+             ;WAS THE DATA TRANSFERRED CORRECTLY?
2298  006612  001412                          BEQ     T23
2299
2300  006614  023737  007062  007042          CMP     @#TDAT02,@#TPAT12       ;DID (BUT FD) FAIL.
2301  006622  001401                          BEQ     T22
2302  006624  000440                  T21:    BR      TERR1
2303  006626  023737  007064  007044  T22:    CMP     @#TDAT03,@#TPAT13
2304  006634  001373                          BNE     T21
2305  006636  000456                          BR      TERR4
2306
2307  006640  077515                  T23:    SOB     R5,T20
2308  006642  000515                          BR      TDONE
2309
2310
2311                                  ;TRAP HERE THROUGH VECTOR 4 IF AN ODD ADDRESS OCCURS.
2312  006644  022716  006372          TERR0:  CMP     #T4,(SP)                ;MAKE SURE THE TRAP WAS ON
2313  006650  001413                          BEQ     1$                      ;AN INSTRUCTION BEING TESTED.
2314  006652  022716  006374                  CMP     #T5,(SP)
2315  006656  001410                          BEQ     1$
2316  006660  022716  006530                  CMP     #T15,(SP)
2317  006664  001405                          BEQ     1$
2318  006666  022716  006532                  CMP     #T16,(SP)
2319  006672  001402                          BEQ     1$
2320  006674  000137  062566                  JMP     @#CPSPUR
2321
2322  006700  011637  001236          1$:     MOV     (SP),@#$TMP2
2323  006704  022626                          CMP     (SP)+,(SP)+
2324  006706  012737  000527  001240          MOV     #527,@#$TMP3
2325  006714  012737  000640  001242          MOV     #640,@#$TMP4
2326  006722  104001                  2$:     ERROR   1
2327  006724  000464                          BR      TDONE
2328
2329                                  ;REPORT DATA FAILURE.
2330  006726                          TERR1:
2331  006726  012737  007066  001242          MOV     #TDATI0,@#$TMP4
2332  006734  012737  007056  001244          MOV     #TDAT00,@#$TMP5
2333  006742  104001                  1$:     ERROR   1
2334  006744  000454                          BR      TDONE
```

```
2335
2336                                        ;REPORT FAILURE OF (BUT FD).
2337  006746  012737  000160  001246  TERR2:  MOV     #160,@#$TMP6
2338  006754  012737  000161  001250          MOV     #161,@#$TMP7
2339  006762  012737  000640  001244  TERR25: MOV     #640,@#$TMP5
2340  006770  104012                  1$:     ERROR   12
2341  006772  000441                          BR      TDONE
2342  006774  012737  000161  001246  TERR4:  MOV     #161,@#$TMP6
2343  007002  012737  000160  001250          MOV     #160,@#$TMP7
2344  007010  000764                          BR      TERR25
2345
2346                                        ;REPORT INCORRECT FPS AFTER STORE INSTRUCTION.
2347  007012                            TERR3:
2348  007012  012737  006530  001236          MOV     #T15,@#$TMP2
2349  007020  010037  001240                  MOV     R0,@#$TMP3
2350  007024  012737  000010  001242          MOV     #10,@#$TMP4
2351  007032  104001                  1$:     ERROR   1
2352  007034  000420                          BR      TDONE
2353
2354  007036  000000                  TPAT10: 0
2355  007040  170360                  TPAT11: 170360
2356  007042  016161                  TPAT12: 016161
2357  007044  052525                  TPAT13: 052525
2358
2359  007046  177777                  TPAT20: -1
2360  007050  177777                  TPAT21: -1
2361  007052  177777                  TPAT22: -1
2362  007054  177777                  TPAT23: -1
2363
2364  007056  000000                  TDAT00: 0
2365  007060  000000                  TDAT01: 0
2366  007062  000000                  TDAT02: 0
2367  007064  000000                  TDAT03: 0
2368
2369  007066  000000                  TDATI0: 0
2370  007070  000000                  TDATI1: 0
2371  007072  000000                  TDATI2: 0
2372  007074  000000                  TDATI3: 0
2373
2374  007076                            TDONE:
2375  007076  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
2376                                                                  ;SEE IF THE USER HAS EXPRESSED
2377                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
2378                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
2379                                                                  ;THE USER TYPED CONTROL G?).
2380
2381
2382
2383                                        ;;*****************************************************************
2384                                        ;*TEST 11       ACCUMULATORS DATA PATTERNS TEST
2385                                        ;*
2386                                        ;*THIS IS A TEST OF THE FLOATING POINT PROCESSOR ACCUMULATORS.
2387                                        ;*EACH ACCUMULATOR IS TESTED IN TWO WAYS:
2388                                        ;*      1 TEST PATTERN GENERATED BY FLOATING A ONE ACROSS
2389                                        ;*        A FIELD OF ZEROES.
2390                                        ;*      2 TEST PATTERN GENERATED BY FLOATING A ZERO ACROSS
```

```
                                    ;*          A FIELD OF ONES.
                                    ;*EACH OF ACCUMULATORS AC0 THROUGH AC5 IS TESTED.
                                    ;;*****************************************************************
007100  000004                      TST11:  SCOPE
007102  170011                              SETD                            ;SET FD.
                                    ;TEST ACCUMULATOR 0 WITH FLOATING ONE
007104  012737  007134  001236              MOV     #G1,@#$TMP2
007112  012700  011002                      MOV     #GPAT00,R0
007116  012701  011042                      MOV     #GDAT00,R1
007122  104414                              LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
007124  004737  010650                      JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
007130  012703  000102                      MOV     #102,R3
007134                              G1:
007134  172410                              LDD     (R0),AC0
007136  174000                              STD     AC0,AC0
007140  172400                              LDD     AC0,AC0                 ;STORE THE TEST PATTERN.
007142  174011                              STD     AC0,(R1)
007144  004737  010746                      JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
                                                                            ;THAT WHICH WAS WRITTEN.
007150  005737  010776                      TST     @#GFLAG1
007154  001004                              BNE     G2
007156  005137  010776                      COM     @#GFLAG1
007162  000261                              SEC
007164  000401                              BR      G3
007166  000241                      G2:     CLC
007170  006160  000006              G3:     ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
007174  006160  000004                      ROL     4(R0)
007200  006160  000002                      ROL     2(R0)
007204  006110                              ROL     (R0)
007206  004737  010726                      JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
                                                                            ;BUFFER.
007212  077330                              SOB     R3,G1
                                    ;TEST ACCUMULATOR 0 WITH FLOATING ZERO
007214  012737  007244  001236              MOV     #G4,@#$TMP2
007222  012700  011012                      MOV     #GPAT10,R0
007226  012701  011042                      MOV     #GDAT00,R1
007232  104414                              LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
007234  004737  010650                      JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
007240  012703  000102                      MOV     #102,R3
007244                              G4:
007244  172410                              LDD     (R0),AC0
007246  174000                              STD     AC0,AC0
007250  172400                              LDD     AC0,AC0                 ;STORE THE TEST PATTERN.
007252  174011                              STD     AC0,(R1)
007254  004737  010746                      JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
                                                                            ;THAT WHICH WAS WRITTEN.
007260  005737  010776                      TST     @#GFLAG1
007264  001004                              BNE     G5
007266  005137  010776                      COM     @#GFLAG1
007272  000241                              CLC
007274  000401                              BR      G6
007276  000261                      G5:     SEC
007300  006160  000006              G6:     ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
007304  006160  000004                      ROL     4(R0)
007310  006160  000002                      ROL     2(R0)
```

```
2447  007314  006110                          ROL     (R0)
2448  007316  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2449                                                                          ;BUFFER.
2450  007322  077330                          SOB     R3,G4
2451
2452                                  ;TEST ACCUMULATOR 1 WITH FLOATING ONE
2453  007324  012737  007354  001236          MOV     #G7,@#$TMP2
2454  007332  012700  011002                  MOV     #GPAT00,R0
2455  007336  012701  011042                  MOV     #GDAT00,R1
2456  007342  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2457  007344  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2458  007350  012703  000102                  MOV     #102,R3
2459  007354                          G7:
2460  007354  172410                          LDD     (R0),AC0
2461  007356  174001                          STD     AC0,AC1
2462  007360  172401                          LDD     AC1,AC0         ;STORE THE TEST PATTERN.
2463  007362  174011                          STD     AC0,(R1)
2464  007364  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2465                                                                          ;THAT WHICH WAS WRITTEN.
2466  007370  005737  010776                  TST     @#GFLAG1
2467  007374  001004                          BNE     G10
2468  007376  005137  010776                  COM     @#GFLAG1
2469  007402  000261                          SEC
2470  007404  000401                          BR      G11
2471  007406  000241                  G10:    CLC
2472  007410  006160  000006          G11:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2473  007414  006160  000004                  ROL     4(R0)
2474  007420  006160  000002                  ROL     2(R0)
2475  007424  006110                          ROL     (R0)
2476  007426  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2477                                                                          ;BUFFER.
2478  007432  077330                          SOB     R3,G7
2479
2480                                  ;TEST ACCUMULATOR 1 WITH FLOATING ZERO
2481  007434  012737  007464  001236          MOV     #G12,@#$TMP2
2482  007442  012700  011012                  MOV     #GPAT10,R0
2483  007446  012701  011042                  MOV     #GDAT00,R1
2484  007452  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2485  007454  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2486  007460  012703  000102                  MOV     #102,R3
2487  007464                          G12:
2488  007464  172410                          LDD     (R0),AC0
2489  007466  174001                          STD     AC0,AC1
2490  007470  172401                          LDD     AC1,AC0         ;STORE THE TEST PATTERN.
2491  007472  174011                          STD     AC0,(R1)
2492  007474  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2493                                                                          ;THAT WHICH WAS WRITTEN.
2494  007500  005737  010776                  TST     @#GFLAG1
2495  007504  001004                          BNE     G13
2496  007506  005137  010776                  COM     @#GFLAG1
2497  007512  000241                          CLC
2498  007514  000401                          BR      G14
2499  007516  000261                  G13:    SEC
2500  007520  006160  000006          G14:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2501  007524  006160  000004                  ROL     4(R0)
2502  007530  006160  000002                  ROL     2(R0)
```

```
2503  007534  006110                          ROL     (R0)
2504  007536  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2505                                                                          ;BUFFER.
2506  007542  077330                          SOB     R3,G12
2507
2508                                  ;TEST ACCUMULATOR 2 WITH FLOATING ONE
2509  007544  012737  007574  001236          MOV     #G15,@#$TMP2
2510  007552  012700  011002                  MOV     #GPAT00,R0
2511  007556  012701  011042                  MOV     #GDAT00,R1
2512  007562  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2513  007564  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2514  007570  012703  000102                  MOV     #102,R3
2515  007574                          G15:
2516  007574  172410                          LDD     (R0),AC0
2517  007576  174002                          STD     AC0,AC2
2518  007600  172402                          LDD     AC2,AC0         ;STORE THE TEST PATTERN.
2519  007602  174011                          STD     AC0,(R1)
2520  007604  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2521                                                                          ;THAT WHICH WAS WRITTEN.
2522  007610  005737  010776                  TST     @#GFLAG1
2523  007614  001004                          BNE     G16
2524  007616  005137  010776                  COM     @#GFLAG1
2525  007622  000261                          SEC
2526  007624  000401                          BR      G17
2527  007626  000241                  G16:    CLC
2528  007630  006160  000006          G17:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2529  007634  006160  000004                  ROL     4(R0)
2530  007640  006160  000002                  ROL     2(R0)
2531  007644  006110                          ROL     (R0)
2532  007646  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2533                                                                          ;BUFFER.
2534  007652  077330                          SOB     R3,G15
2535
2536                                  ;TEST ACCUMULATOR 2 WITH FLOATING ZERO
2537  007654  012737  007704  001236          MOV     #G20,@#$TMP2
2538  007662  012700  011012                  MOV     #GPAT10,R0
2539  007666  012701  011042                  MOV     #GDAT00,R1
2540  007672  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2541  007674  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2542  007700  012703  0001C2                  MOV     #102,R3
2543  007704                          G20:
2544  007704  172410                          LDD     (R0),AC0
2545  007706  174002                          STD     AC0,AC2
2546  007710  172402                          LDD     AC2,AC0         ;STORE THE TEST PATTERN.
2547  007712  174011                          STD     AC0,(R1)
2548  007714  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2549                                                                          ;THAT WHICH WAS WRITTEN.
2550  007720  005737  010776                  TST     @#GFLAG1
2551  007724  001004                          BNE     G21
2552  007726  005137  010776                  COM     @#GFLAG1
2553  007732  000241                          CLC
2554  007734  000401                          BR      G22
2555  007736  000261                  G21:    SEC
2556  007740  006160  000006          G22:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2557  007744  006160  000004                  ROL     4(R0)
2558  007750  006160  000002                  ROL     2(R0)
```

```
2559  007754  006110                          ROL     (R0)
2560  007756  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2561                                                                          ;BUFFER.
2562  007762  077330                          SOB     R3,G20
2563
2564                                  ;TEST ACCUMULATOR 3 WITH FLOATING ONE
2565  007764  012737  010014  001236          MOV     #G23,@#$TMP2
2566  007772  012700  011002                  MOV     #GPAT00,R0
2567  007776  012701  011042                  MOV     #GDAT00,R1
2568  010002  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2569  010004  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2570  010010  012703  000102                  MOV     #102,R3
2571  010014                          G23:
2572  010014  172410                          LDD     (R0),AC0
2573  010016  174003                          STD     AC0,AC3
2574  010020  172403                          LDD     AC3,AC0         ;STORE THE TEST PATTERN.
2575  010022  174011                          STD     AC0,(R1)
2576  010024  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2577                                                                          ;THAT WHICH WAS WRITTEN.
2578  010030  005737  010776                  TST     @#GFLAG1
2579  010034  001004                          BNE     G24
2580  010036  005137  010776                  COM     @#GFLAG1
2581  010042  000261                          SEC
2582  010044  000401                          BR      G25
2583  010046  000241                  G24:    CLC
2584  010050  006160  000006          G25:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2585  010054  006160  000004                  ROL     4(R0)
2586  010060  006160  000002                  ROL     2(R0)
2587  010064  006110                          ROL     (R0)
2588  010066  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2589                                                                          ;BUFFER.
2590  010072  077330                          SOB     R3,G23
2591
2592                                  ;TEST ACCUMULATOR 3 WITH FLOATING ZERO
2593  010074  012737  010124  001236          MOV     #G26,@#$TMP2
2594  010102  012700  011012                  MOV     #GPAT10,R0
2595  010106  012701  011042                  MOV     #GDAT00,R1
2596  010112  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2597  010114  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2598  010120  012703  000102                  MOV     #102,R3
2599  010124                          G26:
2600  010124  172410                          LDD     (R0),AC0
2601  010126  174003                          STD     AC0,AC3
2602  010130  172403                          LDD     AC3,AC0         ;STORE THE TEST PATTERN.
2603  010132  174011                          STD     AC0,(R1)
2604  010134  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2605                                                                          ;THAT WHICH WAS WRITTEN.
2606  010140  005737  010776                  TST     @#GFLAG1
2607  010144  001004                          BNE     G27
2608  010146  005137  010776                  COM     @#GFLAG1
2609  010152  000241                          CLC
2610  010154  000401                          BR      G30
2611  010156  000261                  G27:    SEC
2612  010160  006160  000006          G30:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2613  010164  006160  000004                  ROL     4(R0)
2614  010170  006160  000002                  ROL     2(R0)
```

```
2615  010174  006110                          ROL     (R0)
2616  010176  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2617                                                                          ;BUFFER.
2618  010202  077330                          SOB     R3,G26
2619
2620                                  ;TEST ACCUMULATOR 4 WITH FLOATING ONE
2621  010204  012737  010234  001236          MOV     #G31,@#$TMP2
2622  010212  012700  011002                  MOV     #GPAT00,R0
2623  010216  012701  011042                  MOV     #GDAT00,R1
2624  010222  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2625  010224  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2626  010230  012703  000102                  MOV     #102,R3
2627  010234                          G31:
2628  010234  172410                          LDD     (R0),AC0
2629  010236  174004                          STD     AC0,AC4
2630  010240  172404                          LDD     AC4,AC0         ;STORE THE TEST PATTERN.
2631  010242  174011                          STD     AC0,(R1)
2632  010244  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2633                                                                          ;THAT WHICH WAS WRITTEN.
2634  010250  005737  010776                  TST     @#GFLAG1
2635  010254  001004                          BNE     G32
2636  010256  005137  010776                  COM     @#GFLAG1
2637  010262  000261                          SEC
2638  010264  000401                          BR      G33
2639  010266  000241                  G32:    CLC
2640  010270  006160  000006          G33:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2641  010274  006160  000004                  ROL     4(R0)
2642  010300  006160  000002                  ROL     2(R0)
2643  010304  006110                          ROL     (R0)
2644  010306  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2645                                                                          ;BUFFER.
2646  010312  077330                          SOB     R3,G31
2647
2648                                  ;TEST ACCUMULATOR 4 WITH FLOATING ZERO
2649  010314  012737  010344  001236          MOV     #G34,@#$TMP2
2650  010322  012700  011012                  MOV     #GPAT10,R0
2651  010326  012701  011042                  MOV     #GDAT00,R1
2652  010332  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2653  010334  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2654  010340  012703  000102                  MOV     #102,R3
2655  010344                          G34:
2656  010344  172410                          LDD     (R0),AC0
2657  010346  174004                          STD     AC0,AC4
2658  010350  172404                          LDD     AC4,AC0         ;STORE THE TEST PATTERN.
2659  010352  174011                          STD     AC0,(R1)
2660  010354  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2661                                                                          ;THAT WHICH WAS WRITTEN.
2662  010360  005737  010776                  TST     @#GFLAG1
2663  010364  001004                          BNE     G35
2664  010366  005137  010776                  COM     @#GFLAG1
2665  010372  000241                          CLC
2666  010374  000401                          BR      G36
2667  010376  000261                  G35:    SEC
2668  010400  006160  000006          G36:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2669  010404  006160  000004                  ROL     4(R0)
2670  010410  006160  000002                  ROL     2(R0)
```

```
2671  010414  006110                          ROL     (R0)
2672  010416  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2673                                                                          ;BUFFER.
2674  010422  077330                          SOB     R3,G34
2675
2676                                  ;TEST ACCUMULATOR 5 WITH FLOATING ONE
2677  010424  012737  010454  001236          MOV     #G37,@#$TMP2
2678  010432  012700  011002                  MOV     #GPAT00,R0
2679  010436  012701  011042                  MOV     #GDAT00,R1
2680  010442  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2681  010444  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2682  010450  012703  000102                  MOV     #102,R3
2683  010454                          G37:
2684  010454  172410                          LDD     (R0),AC0
2685  010456  174005                          STD     AC0,AC5
2686  010460  172405                          LDD     AC5,AC0         ;STORE THE TEST PATTERN.
2687  010462  174011                          STD     AC0,(R1)
2688  010464  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2689                                                                          ;THAT WHICH WAS WRITTEN.
2690  010470  005737  010776                  TST     @#GFLAG1
2691  010474  001004                          BNE     G40
2692  010476  005137  010776                  COM     @#GFLAG1
2693  010502  000261                          SEC
2694  010504  000401                          BR      G41
2695  010506  000241                  G40:    CLC
2696  010510  006160  000006          G41:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2697  010514  006160  000004                  ROL     4(R0)
2698  010520  006160  000002                  ROL     2(R0)
2699  010524  006110                          ROL     (R0)
2700  010526  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2701                                                                          ;BUFFER.
2702  010532  077330                          SOB     R3,G37
2703
2704                                  ;TEST ACCUMULATOR 5 WITH FLOATING ZERO
2705  010534  012737  010564  001236          MOV     #G42,@#$TMP2
2706  010542  012700  011012                  MOV     #GPAT10,R0
2707  010546  012701  011042                  MOV     #GDAT00,R1
2708  010552  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2709  010554  004737  010650                  JSR     PC,@#GSETUP             ;LOAD TEST PATTERN.
2710  010560  012703  000102                  MOV     #102,R3
2711  010564                          G42:
2712  010564  172410                          LDD     (R0),AC0
2713  010566  174005                          STD     AC0,AC5
2714  010570  172405                          LDD     AC5,AC0         ;STORE THE TEST PATTERN.
2715  010572  174011                          STD     AC0,(R1)
2716  010574  004737  010746                  JSR     PC,@#GCMP               ;COMPARE THE DATA READ WITH
2717                                                                          ;THAT WHICH WAS WRITTEN.
2718  010600  005737  010776                  TST     @#GFLAG1
2719  010604  001004                          BNE     G43
2720  010606  005137  010776                  COM     @#GFLAG1
2721  010612  000241                          CLC
2722  010614  000401                          BR      G44
2723  010616  000261                  G43:    SEC
2724  010620  006160  000006          G44:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
2725  010624  006160  000004                  ROL     4(R0)
2726  010630  006160  000002                  ROL     2(R0)
```

```
2727  010634  006110                          ROL     (R0)
2728  010636  004737  010726                  JSR     PC,@#GRESET             ;RESET DEFAULT PATTERN IN OUTPUT
2729                                                                          ;BUFFER.
2730  010642  077330                          SOB     R3,G42
2731
2732
2733  010644  000137  011052                  JMP     @#GDONE
2734
2735                                  ;USE THIS ROUTINE TO INITIALIZE ALL THE DATA BUFFERS.
2736  010650  012705  010776          GSETUP: MOV     #GFLAG1,R5
2737  010654  012704  000026                  MOV     #26,R4
2738  010660  005025                  1$:     CLR     (R5)+
2739  010662  077402                          SOB     R4,1$
2740
2741  010664  012705  011012                  MOV     #GPAT10,R5
2742  010670  012704  000010                  MOV     #10,R4
2743  010674  005125                  2$:     COM     (R5)+
2744  010676  077402                          SOB     R4,2$
2745
2746  010700  020067  000076          GS1:    CMP     R0,GPAT00
2747  010704  001401                          BEQ     3$
2748  010706  000207                          RTS     PC
2749
2750  010710  012705  011042          3$:     MOV     #GDAT00,R5
2751  010714  012704  000004                  MOV     #4,R4
2752  010720  005125                  4$:     COM     (R5)+
2753  010722  077402                          SOB     R4,4$
2754  010724  000207                          RTS     PC
2755
2756  010726  012705  011042          GRESET: MOV     #GDAT00,R5
2757  010732  012704  000004                  MOV     #4,R4
2758  010736  005025                  1$:     CLR     (R5)+
2759  010740  077402                          SOB     R4,1$
2760  010742  000137  010700                  JMP     @#GS1
2761
2762                                  ;SEE IF THE DATA WRITTEN MATCHES THE DATA READ.
2763  010746  011637  001244          GCMP:   MOV     (SP),@#$TMP5    ;STORE ERROR PC
2764  010752  012705  011042                  MOV     #GDAT00,R5
2765  010756  012704  000004                  MOV     #4,R4
2766  010762  010002                          MOV     R0,R2
2767  010764  022225                  1$:     CMP     (R2)+,(R5)+
2768  010766  001401                          BEQ     2$
2769  010770  104003                          ERROR   3               ;PROBABLY BAD MMU, OTHERWISE IT IS THE FP CHIP
2770  010772  077404                  2$:     SOB     R4,1$
2771  010774  000207                          RTS     PC
2772
2773
2774
2775
2776  010776  000000          GFLAG1: 0
2777  011000  000000          GFLAG2: 0
2778
2779  011002  000000          GPAT00: 0
2780  011004  000000          GPAT01: 0
2781  011006  000000          GPAT02: 0
2782  011010  000000          GPAT03: 0
```

```
2783
2784  011012  177777                  GPAT10: -1
2785  011014  177777                  GPAT11: -1
2786  011016  177777                  GPAT12: -1
2787  011020  177777                  GPAT13: -1
2788
2789  011022  177777                  GAND0:  -1
2790  011024  177777                  GAND1:  -1
2791  011026  177777                  GAND2:  -1
2792  011030  177777                  GAND3:  -1
2793
2794  011032  000000                  GOR0:   0
2795  011034  000000                  GOR1:   0
2796  011036  000000                  GOR2:   0
2797  011040  000000                  GOR3:   0
2798
2799  011042  000000                  GDAT00: 0
2800  011044  000000                  GDAT01: 0
2801  011046  000000                  GDAT02: 0
2802  011050  000000                  GDAT03: 0
2803
2804
2805  011052                          GDONE:
2806  011052  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
2807                                                                  ;SEE IF THE USER HAS EXPRESSED
2808                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
2809                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
2810                                                                  ;THE USER TYPED CONTROL G?).
2811
2812
2813                                  ;;*****************************************************************
2814                                  ;*TEST 12       FPP ACCUMULATORS DUAL ADDRESS TEST
2815                                  ;*
2816                                  ;*THIS TEST PERFORMS A DUAL ADDRESSING TEST ON THE FLOATING ACCUMULATORS.
2817                                  ;*NOTE THAT ACCUMULATOR ZERO IS USED TO ACCESS ALL THE OTHERS.
2818                                  ;*
2819                                  ;;*****************************************************************
2820  011054  000004                  TST12:  SCOPE
2821  011056  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2822
2823  011060  005037  011604          H1:     CLR     @#HFLAG
2824  011064  012700  011606                  MOV     #HA1W,R0                ;INITIALIZE THE LOAD BUFFER DATA.
2825  011070  012701  011726                  MOV     #HDAT1,R1
2826  011074  012703  000024                  MOV     #24,R3
2827  011100  012120                  H2:     MOV     (R1)+,(R0)+
2828  011102  077302                          SOB     R3,H2
2829
2830  011104  004767  000422                  JSR     PC,HCLR         ;CLEAR THE OUTPUT DATA BUFFER.
2831
2832  011110  170011                  H3:     SETD
2833                                  ;LOAD ACCUMULATOR 1
2834  011112  012700  011606                  MOV     #HA1W,R0
2835  011116  172410                          LDD     (R0),AC0
2836  011120  174001                          STD     AC0,AC1
2837                                  ;LOAD ACCUMULATOR 2
2838  011122  012700  011616                  MOV     #HA2W,R0
```

```
2839  011126  172410                          LDD     (R0),AC0
2840  011130  174002                          STD     AC0,AC2
2841                                  ;LOAD ACCUMULATOR 3
2842  011132  012700  011626                 MOV     #HA3W,R0
2843  011136  172410                          LDD     (R0),AC0
2844  011140  174003                          STD     AC0,AC3
2845                                  ;LOAD ACCUMULATOR 4
2846  011142  012700  011636                 MOV     #HA4W,R0
2847  011146  172410                          LDD     (R0),AC0
2848  011150  174004                          STD     AC0,AC4
2849                                  ;LOAD ACCUMULATOR 5
2850  011152  012700  011646                 MOV     #HA5W,R0
2851  011156  172410                          LDD     (R0),AC0
2852  011160  174005                          STD     AC0,AC5
2853
2854  011162  004737  011416          H4:    JSR     PC,@#HSTD               ;GO READ ALL ACCUMULATORS BACK.
2855
2856  011166  004737  011474                 JSR     PC,@#HCMP               ;SEE IF DATA IS CORRECT.
2857
2858                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 1,
2859                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
2860                                  ;THE DATA.
2861  011172  012700  011606                 MOV     #HA1W,R0
2862  011176  012702  000004                 MOV     #4,R2
2863  011202  010001                          MOV     R0,R1
2864  011204  005121                  H5:     COM     (R1)+
2865  011206  172410                          LDD     (R0),AC0
2866  011210  174001                          STD     AC0,AC1
2867  011212  004737  011416                 JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
2868  011216  004737  011474                 JSR     PC,@#HCMP               ;CHECK THE DATA.
2869  011222  077210                          SOB     R2,H5
2870
2871                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 2,
2872                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
2873                                  ;THE DATA.
2874  011224  012700  011616                 MOV     #HA2W,R0
2875  011230  012702  000004                 MOV     #4,R2
2876  011234  010001                          MOV     R0,R1
2877  011236  005121                  H6:     COM     (R1)+
2878  011240  172410                          LDD     (R0),AC0
2879  011242  174002                          STD     AC0,AC2
2880  011244  004737  011416                 JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
2881  011250  004737  011474                 JSR     PC,@#HCMP               ;CHECK THE DATA.
2882  011254  077210                          SOB     R2,H6
2883
2884                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 3,
2885                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
2886                                  ;THE DATA.
2887  011256  012700  011626                 MOV     #HA3W,R0
2888  011262  012702  000004                 MOV     #4,R2
2889  011266  010001                          MOV     R0,R1
2890  011270  005121                  H7:     COM     (R1)+
2891  011272  172410                          LDD     (R0),AC0
2892  011274  174003                          STD     AC0,AC3
2893  011276  004737  011416                 JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
2894  011302  004737  011474                 JSR     PC,@#HCMP               ;CHECK THE DATA.
```

```
2895  011306  077210                          SOB     R2,H7
2896
2897                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 4,
2898                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
2899                                  ;THE DATA.
2900  011310  012700  011636          H10:    MOV     #HA4W,R0
2901  011314  012702  000004                  MOV     #4,R2
2902  011320  010001                          MOV     R0,R1
2903  011322  005121                  H10:    COM     (R1)+
2904  011324  172410                          LDD     (R0),AC0
2905  011326  174004                          STD     AC0,AC4
2906  011330  004737  011416                  JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
2907  011334  004737  011474                  JSR     PC,@#HCMP               ;CHECK THE DATA.
2908  011340  077210                          SOB     R2,H10
2909
2910                                  ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 5,
2911                                  ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
2912                                  ;THE DATA.
2913  011342  012700  011646                  MOV     #HA5W,R0
2914  011346  012702  000004                  MOV     #4,R2
2915  011352  010001                          MOV     R0,R1
2916  011354  005121                  H11:    COM     (R1)+
2917  011356  172410                          LDD     (R0),AC0
2918  011360  174005                          STD     AC0,AC5
2919  011362  004737  011416                  JSR     PC,@#HSTD               ;READ ALL THE ACCUMULATORS BACK.
2920  011366  004737  011474                  JSR     PC,@#HCMP               ;CHECK THE DATA.
2921  011372  077210                          SOB     R2,H11
2922
2923
2924  011374  005737  011604                  TST     @#HFLAG
2925  011400  001402                          BEQ     H12
2926  011402  000137  011776                  JMP     @#HDONE
2927
2928  011406  005137  011604          H12:    COM     @#HFLAG
2929  011412  000137  011110                  JMP     @#H3
2930
2931                                  ;STORE ALL ACCUMULATORS IN THE OUTPUT BUFFERS.
2932  011416  004737  011532          HSTD:   JSR     PC,@#HCLR               ;CLEAR ALL OUTPUT BUFFERS.
2933                                  ;STORE ACCUMULATOR 1
2934  011422  012704  011656                  MOV     #HA1R,R4
2935  011426  172401                          LDD     AC1,AC0
2936  011430  174014                          STD     AC0,(R4)
2937                                  ;STORE ACCUMULATOR 2
2938  011432  012704  011666                  MOV     #HA2R,R4
2939  011436  172402                          LDD     AC2,AC0
2940  011440  174014                          STD     AC0,(R4)
2941                                  ;STORE ACCUMULATOR 3
2942  011442  012704  011676                  MOV     #HA3R,R4
2943  011446  172403                          LDD     AC3,AC0
2944  011450  174014                          STD     AC0,(R4)
2945                                  ;STORE ACCUMULATOR 4
2946  011452  012704  011706                  MOV     #HA4R,R4
2947  011456  172404                          LDD     AC4,AC0
2948  011460  174014                          STD     AC0,(R4)
2949                                  ;STORE ACCUMULATOR 5
2950  011462  012704  011716                  MOV     #HA5R,R4
```

```
                                        LDD     AC5,AC0
                                        STD     AC0,(R4)
                                        RTS     PC

                                ;COMPARE DATA LOADED WITH DATA READ.
                                HCMP:   MOV     (SP)+,@#HADR            ;SAVE RETURN ADDRESS.
                                        MOV     #HA1W,R3
                                        MOV     #HA1R,R4
                                        MOV     #24,R5
                                HCMP1:  CMP     (R3)+,(R4)+
                                        BEQ     HCMP2
                                        JMP     @#HERROR
                                HCMP2:  SOB     R5,HCMP1
                                        JMP     @HADR

                                ;CLEAR THE DATA OUTPUT BUFFER.
                                HCLR:   MOV     #HA1R,R4
                                        MOV     #24,R5
                                HCLR1:  CLR     (R4)+
                                        SOB     R5,HCLR1
                                        RTS     PC

                                ;REPORT ERROR.
                                HERROR:
                                        MOV     #HA1W,R3
                                        MOV     #$TMP2,R4
                                        MOV     #12,R5
                                1$:     MOV     R3,(R4)+
                                        ADD     #10,R3
                                        SOB     R5,1$
                                2$:     ERROR   1
                                        JMP     @#HDONE

                                HADR:   0
                                HFLAG:  0

                                HA1W:   .WORD   0,0,0,0

                                HA2W:   .WORD   0,0,0,0

                                HA3W:   .WORD   0,0,0,0

                                HA4W:   .WORD   0,0,0,0

                                HA5W:   .WORD   0,0,0,0

                                HA1R:   .WORD   0,0,0,0

                                HA2R:   .WORD   0,0,0,0

                                HA3R:   .WORD   0,0,0,0

                                HA4R:   .WORD   0,0,0,0
```

```
3007  011716  000000  000000  000000  HA5R:   .WORD   0,0,0,0
3008  011724  000000
3009
3010  011726  073567  073567  073567  HDAT1:  .WORD   73567,73567,73567,73567
3011  011734  073567
3012  011736  063146  063146  063146  HDAT2:  .WORD   63146,63146,63146,63146
3013  011744  063146
3014  011746  010421  010421  010421  HDAT3:  .WORD   10421,10421,10421,10421
3015  011754  010421
3016  011756  031463  031463  031463  HDAT4:  .WORD   31463,31463,31463,31463
3017  011764  031463
3018  011766  042104  042104  042104  HDAT5:  .WORD   42104,42104,42104,42104
3019  011774  042104
3020
3021  011776                        HDONE:
3022  011776  104413                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
3023                                                                ;SEE IF THE USER HAS EXPRESSED
3024                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
3025                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
3026                                                                ;THE USER TYPED CONTROL G?).
3027
3028
3029                                ;;******************************************************************
3030                                ;*TEST 13       FSRC MODE 0 WITH ILLEGAL ACCUMULATOR TEST
3031                                ;*
3032                                ;*THIS IS A TEST OF FSRC MODE 0 WITH ACCUMULATORS 6 AND 7. USE OF
3033                                ;*EITHER OF THESE NON-EXISTENT ACCUMULATORS SHOULD RESULT IN A TRAP TO 244
3034                                ;*WITH FEC=2 (ILLEGAL OPCODE TRAP)
3035                                ;*
3036                                ;;******************************************************************
3037  012000  000004                TST13:  SCOPE
3038  012002                        S1:
3039  012002  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3040  012004  170011                        SETD                    ;SET FD
3041  012006  012700  012512                MOV     #SPAT10,R0      ;LOAD AC0
3042  012012  172410                        LDD     (R0),AC0
3043
3044  012014  012737  012212  000244        MOV     #SERR0,@#FPVECT ;USE OF THE NON-EXISTENT AC-
3045                                                                ;CUMULATOR SHOULD RESULT IN
3046                                                                ;A TRAP TO 244.
3047  012022  012700  000001                MOV     #1,R0           ;A FAILURE IN THE FSRC FLOWS
3048                                                                ;WILL RESULT IN AN ODD ADDRESS
3049  012026  012737  012422  000004        MOV     #SERR1,@#ERRVECT ;TRAP TO 4.
3050  012034  005003                        CLR     R3
3051
3052  012036  172407                S2:     LDD     AC7,AC0
3053  012040  170000                S3:     CFCC
3054  012042  005203                        INC     R3
3055  012044  005203                S4:     INC     R3
3056
3057  012046  012701  012522                MOV     #SDAT00,R1      ;NO TRAP OCCURRED!!
3058  012052  174011                        STD     AC0,(R1)        ;SEE IF AC0 WAS MODIFIED.
3059
3060  012054  012701  012522                MOV     #SDAT00,R1
3061  012060  012702  012512                MOV     #SPAT10,R2
3062  012064  012703  000004                MOV     #4,R3
```

```
3063  012070  022122                  S5:     CMP     (R1)+,(R2)+
3064  012072  001402                          BEQ     S6
3065  012074  000137  012352                  JMP     @#SERR2                 ;BAD DATA
3066  012100  077305                  S6:     SOB     R3,S5
3067
3068  012102  000137  012376                  JMP     @#SERR3                 ;MISSING TRAP
3069
3070                                  ;NOW TEST AC6.
3071  012106                          S7:
3072  012106  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3073  012110  170011                          SETD
3074
3075  012112  012700  012512                  MOV     #SPAT10,R0              ;LOAD AC0
3076  012116  172410                          LDD     (R0),AC0
3077
3078  012120  012737  012270  000244          MOV     #SERR4,@#FPVECT
3079  012126  012700  000001                  MOV     #1,R0
3080  012132  012737  012454  000004          MOV     #SERR5,@#ERRVECT
3081  012140  005003                          CLR     R3
3082
3083  012142  172406                  S8:     LDD     AC6,AC0
3084  012144  170000                  S9:     CFCC
3085  012146  005203                          INC     R3
3086  012150  005203                  S10:    INC     R3
3087
3088  012152  012701  012522                  MOV     #SDAT00,R1
3089  012156  174011                          STD     AC0,(R1)                ;NO TRAP! GET AC0.
3090
3091  012160  012701  012522                  MOV     #SDAT00,R1              ;WAS AC0 MODIFIED.
3092  012164  012702  012512                  MOV     #SPAT10,R2
3093  012170  012703  000004                  MOV     #4,R3
3094  012174  022122                  S11:    CMP     (R1)+,(R2)+
3095  012176  001402                          BEQ     S12
3096  012200  000137  012364                  JMP     @#SERR6
3097  012204  077305                  S12:    SOB     R3,S11
3098  012206  000137  012410                  JMP     @#SERR7
3099
3100                                  ;TRAPPED TO 244.
3101  012212  021627  012040          SERR0:  CMP     (SP),#S3                ;PC OF TRAP CORRECT?
3102  012216  001402                          BEQ     1$
3103  012220  000137  062534                  JMP     @#FPSPUR
3104
3105  012224  012737  012106  012506  1$:     MOV     #S7,@#SADR
3106
3107  012232  011637  001236          SERR10: MOV     (SP),@#$TMP2
3108  012236  022626                          CMP     (SP)+,(SP)+
3109  012240  005004                          CLR     R4
3110  012242  170204                          STFPS   R4                      ;IS FPS CORRECT?
3111  012244  022704  100200                  CMP     #100200,R4
3112  012250  001020                          BNE     SERR15
3113
3114  012252  005004                          CLR     R4
3115  012254  170304                          STST    R4                      ;IS FEC CORRECT?
3116  012256  022704  000002                  CMP     #2,R4
3117  012262  001023                          BNE     SERR20
3118  012264  000177  000216                  JMP     @SADR
```

```
3119
3120  012270  021627  012144          SERR4:  CMP     (SP),#S9
3121  012274  001402                          BEQ     1$
3122  012276  000137  062534                  JMP     @#FPSPUR
3123  012302  012737  012532  012506  1$:     MOV     #SDONE,@#SADR
3124  012310  000750                          BR      SERR10
3125
3126                                  ;REPORT FPS FAILURE:
3127  012312  012737  100200  001242  SERR15: MOV     #100200,@#$TMP4
3128  012320  010437  001240                  MOV     R4,@#$TMP3
3129  012324  104001                  1$:     ERROR   1
3130  012326  000177  000154                  JMP     @SADR
3131
3132                                  ;REPORT FEC BAD:
3133  012332  012737  000002  001242  SERR20: MOV     #2,@#$TMP4
3134  012340  010437  001240                  MOV     R4,@#$TMP3
3135  012344  104001                  1$:     ERROR   1
3136  012346  000177  000134                  JMP     @SADR
3137
3138
3139                                  ;AC0 WAS MODIFIED. (BUT FSRC) FORK FAILED.
3140  012352  012737  012036  001236  SERR2:  MOV     #S2,@#$TMP2
3141  012360  104001                  1$:     ERROR   1
3142  012362  000463                          BR      SDONE
3143  012364  012737  012142  001236  SERR6:  MOV     #S8,@#$TMP2
3144  012372  104001                  1$:     ERROR   1
3145  012374  000456                          BR      SDONE
3146
3147  012376  012737  012036  001236  SERR3:  MOV     #S2,@#$TMP2
3148  012404  104001                  1$:     ERROR   1
3149  012406  000451                          BR      SDONE
3150  012410  012737  012142  001236  SERR7:  MOV     #S8,@#$TMP2
3151  012416  104001                  1$:     ERROR   1
3152  012420  000444                          BR      SDONE
3153
3154                                  ;FAILURE OF (BUT FSRC) CAUSED AN ODD ADDRESS TRAP TO 4.
3155  012422  021627  012040          SERR1:  CMP     (SP),#S3                ;DID TRAP OCCUR ON TESTED INSTRUCTION?
3156  012426  001405                          BEQ     1$
3157  012430  021627  012044                  CMP     (SP),#S4
3158  012434  001402                          BEQ     1$
3159  012436  000137  062566                  JMP     @#CPSPUR
3160
3161  012442  011637  001236          1$:     MOV     (SP),@#$TMP2
3162  012446  022626                          CMP     (SP)+,(SP)+
3163  012450  104001                  2$:     ERROR   1
3164  012452  000427                          BR      SDONE
3165
3166  012454  021627  012142          SERR5:  CMP     (SP),#S8                ;DID TRAP OCCUR ON TEST INSTRUCTION?
3167  012460  001405                          BEQ     1$
3168  012462  021627  012144                  CMP     (SP),#S9
3169  012466  001402                          BEQ     1$
3170  012470  000137  062566                  JMP     @#CPSPUR
3171
3172  012474  011637  001236          1$:     MOV     (SP),@#$TMP2
3173  012500  022626                          CMP     (SP)+,(SP)+
3174  012502  104001                  2$:     ERROR   1
```

```
3175  012504  000412                          BR      SDONE
3176
3177  012506  000000                  SADR:   0
3178  012510  177777                          -1
3179  012512  010421                  SPAT10: 10421
3180  012514  021042                  SPAT11: 21042
3181  012516  031463                  SPAT12: 31463
3182  012520  042104                  SPAT13: 42104
3183
3184  012522  000000                  SDAT00: 0
3185  012524  000000                  SDAT01: 0
3186  012526  000000                  SDAT02: 0
3187  012530  000000                  SDAT03: 0
3188
3189  012532                          SDONE:
3190  012532  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
3191                                                                  ;SEE IF THE USER HAS EXPRESSED
3192                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
3193                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
3194                                                                  ;THE USER TYPED CONTROL G?).
3195
3196                                  ;;**************************************************************
3197                                  ;*TEST 14       FSRC MODE 2 TEST
3198                                  ;*
3199                                  ;* THIS IS A TEST OF FSRC MODE 2, AUTO
3200                                  ;* INCREMENT MODE.
3201                                  ;*
3202                                  ;;**************************************************************
3203  012534  000004                  TST14:  SCOPE
3204  012536  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3205
3206  012540                          J1:
3207  012540  170011                          SETD                    ;SET DOUBLE MODE
3208
3209  012542  012700  013016                  MOV     #JDAT0,R0
3210  012546  172410                          LDD     (R0),AC0        ;LOAD AC0=ALL 1
3211
3212  012550  012700  012776                  MOV     #JDATI0,R0
3213  012554  005003                          CLR     R3
3214  012556  012737  012646  000004         MOV     #JERR0,@#ERRVECT
3215
3216  012564  172420                  J2:     LDD     (R0)+,AC0       ;TEST INSTRUCTION
3217  012566  005203                  J3:     INC     R3
3218  012570  005203                  J4:     INC     R3
3219
3220  012572  012701  013006                  MOV     #JDAT00,R1
3221  012576  174011                          STD     AC0,(R1)        ;PICK UP RESULTS
3222
3223  012600  020027  012766                  CMP     R0,#JBUF0       ;WAS AN AUTO
3224  012604  001001                          BNE     1$              ;DECREMENT EXECUTED?
3225  012606  000442                          BR      JERR1
3226
3227  012610  012702  012776          1$:     MOV     #JDATI0,R2      ;IS DATA CORRECT?
3228  012614  012703  013006                  MOV     #JDAT00,R3
3229  012620  012704  000004                  MOV     #4,R4
3230  012624  022223                  J5:     CMP     (R2)+,(R3)+
```

```
3231  012626  001401                        BEQ     J6
3232  012630  000443                        BR      JERR2
3233  012632  077404              J6:       SOB     R4,J5
3234
3235  012634  022700  013006              CMP     #JDATI0+10,R0   ;WAS R0 INCREM.
3236  012640  001401                        BEQ     J7              ;BY 10 (OCTAL)
3237  012642  000424                        BR      JERR1
3238
3239  012644  000470              J7:       BR      JDONE
3240
3241                                ;IF A TRAP THROUGH 4 OCCURS COME HERE
3242
3243  012646  021627  012566      JERR0:    CMP     (SP),#J3        ;SEE IF THE TRAP
3244  012652  001405                        BEQ     J10             ;OCCURRED ON THE
3245  012654  021627  012570              CMP     (SP),#J4        ;TESTED INSTRUCTION
3246  012660  001402                        BEQ     J10
3247  012662  000137  062566              JMP     @#CPSPUR
3248
3249  012666  012737  000762  001240  J10:       MOV     #762,@#$TMP3    ;REPORT FSRC FLOW
3250  012674  012737  000322  001242              MOV     #322,@#$TMP4    ;FAILURE
3251  012702  011637  001236                    MOV     (SP),@#$TMP2
3252  012706  022626                      CMP     (SP)+,(SP)+
3253  012710  104001              1$:       ERROR   1
3254  012712  000445                        BR      JDONE
3255
3256  012714                      JERR1:                          ;REPORT, R0 NOT
3257  012714  012737  012564  001236              MOV     #J2,@#$TMP2     ;CORRECTLY AFFECTED
3258  012722  010037  001240                    MOV     R0,@#$TMP3
3259  012726  012737  013006  001242              MOV     #JDATI0+10,@#$TMP4
3260  012734  104001              1$:       ERROR   1
3261  012736  000433                        BR      JDONE
3262
3263                                ;REPORT DATA FAILURE
3264
3265  012740                      JERR2:
3266  012740  012737  012564  001236              MOV     #J2,@#$TMP2
3267  012746  012737  012776  001240              MOV     #JDATI0,@#$TMP3
3268  012754  012737  013006  001242              MOV     #JDAT00,@#$TMP4
3269  012762  104001              1$:       ERROR   1
3270  012764  000420                        BR      JDONE
3271
3272  012766  010421              JBUF0:    .WORD   010421
3273  012770  021042              JBUF1:            021042
3274  012772  042104              JBUF2:            042104
3275  012774  031463              JBUF3:            031463
3276
3277  012776  052525              JDATI0:           052525
3278  013000  114631              JDATI1:           114631
3279  013002  063146              JDATI2:           063146
3280  013004  073567              JDATI3:           073567
3281
3282  013006  000000              JDAT00:           0
3283  013010  000000              JDAT01:           0
3284  013012  000000              JDAT02:           0
3285  013014  000000              JDAT03:           0
3286
```

```
 3287  013016  177777                  JDAT0:          -1
 3288  013020  177777                  JDAT1:          -1
 3289  013022  177777                  JDAT2:          -1
 3290  013024  177777                  JDAT3:          -1
 3291
 3292
 3293  013026                          JDONE:
 3294  013026  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 3295                                                                  ;SEE IF THE USER HAS EXPRESSED
 3296                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 3297                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 3298                                                                  ;THE USER TYPED CONTROL G?).
 3299
 3300
 3301                                  ;;*****************************************************************
 3302                                  ;*TEST 15       FSRC MODE 4 TEST
 3303                                  ;*
 3304                                  ;* THIS IS A TEST OF FSRC MODE 4, AUTO
 3305                                  ;* DECREMENT MODE.
 3306                                  ;*
 3307                                  ;;*****************************************************************
 3308  013030  000004                  TST15:  SCOPE
 3309  013032  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 3310
 3311  013034                          K1:
 3312  013034  170011                          SETD                    ;SET DOUBLE MODE
 3313
 3314  013036  012700  013310                  MOV     #KPAT0,R0
 3315  013042  172410                          LDD     (R0),AC0        ;LOAD A DEFAULT
 3316                                                                  ;PATTERN INTO AC0
 3317  013044  012700  013270                  MOV     #KBUF0,R0
 3318  013050  005003                          CLR     R3
 3319  013052  012737  013142  000004         MOV     #KERR0,@#ERRVECT
 3320
 3321  013060  172440                  K2:     LDD     -(R0),AC0       ;TEST INSTRUCTION
 3322  013062  005203                  K3:     INC     R3
 3323  013064  005203                  K4:     INC     R3
 3324
 3325  013066  012701  013300                  MOV     #KDAT00,R1
 3326  013072  174011                          STD     AC0,(R1)        ;PICK UP THE RESULT
 3327
 3328  013074  020027  013300                  CMP     R0,#KBUF0+10    ;WAS AN AUTO
 3329  013100  001001                          BNE     1$              ;INCREMENT EXECUTED
 3330  013102  000441                          BR      KERR1
 3331
 3332  013104  012702  013260          1$:     MOV     #KDAT10,R2      ;IS DATA CORRECT?
 3333  013110  012703  013300                  MOV     #KDAT00,R3
 3334  013114  012704  000004                  MOV     #4,R4
 3335  013120  022223                  K5:     CMP     (R2)+,(R3)+
 3336  013122  001401                          BEQ     K6
 3337  013124  000442                          BR      KERR2
 3338  013126  077404                  K6:     SOB     R4,K5
 3339
 3340  013130  022700  013260                  CMP     #KBUF0-10,R0    ;WAS R0 DECREMENTED
 3341  013134  001401                          BEQ     K7              ;PROPERLY?
 3342  013136  000423                          BR      KERR1
```

```
3343
3344  013140  000467                    K7:     BR      KDONE
3345
3346                                    ;TRAP TO HERE ON AN ODD ADDRESS ERROR
3347
3348  013142  021627  013062            KERR0:  CMP     (SP),#K3        ;SEE IF THE ERROR
3349  013146  001405                            BEQ     K10             ;OCCURRED AT THE
3350  013150  021627  013064                    CMP     (SP),#K4        ;INSTRUCTION TESTED.
3351  013154  001402                            BEQ     K10
3352  013156  000137  062566                    JMP     @#CPSPUR
3353
3354  013162  012737  000762  001240  K10:     MOV     #762,@#$TMP3    ;REPORT FAILURE IN
3355  013170  012737  000324  001242            MOV     #324,@#$TMP4    ;FSRC FLOWS
3356  013176  011637  001236                    MOV     (SP),@#$TMP2
3357  013202  104001                    1$:     ERROR   1
3358  013204  000445                            BR      KDONE
3359
3360  013206                            KERR1:                          ;REPORT, R0
3361  013206  012737  013060  001236            MOV     #K2,@#$TMP2     ;INCORRECTLY AFFECTED.
3362  013214  010037  001240                    MOV     R0,@#$TMP3
3363  013220  012737  013260  001242            MOV     #KDATI0,@#$TMP4
3364  013226  104001                    1$:     ERROR   1
3365  013230  000433                            BR      KDONE
3366
3367                                    ;REPORT DATA FAILURE
3368
3369  013232                            KERR2:
3370  013232  012737  013060  001236            MOV     #K2,@#$TMP2
3371  013240  012737  013260  001240            MOV     #KDATI0,@#$TMP3
3372  013246  012737  013300  001242            MOV     #KDAT00,@#$TMP4
3373  013254  104001                    1$:     ERROR   1
3374  013256  000420                            BR      KDONE
3375
3376  013260  052525                    KDATI0: .WORD   052525
3377  013262  114631                    KDATI1:         114631
3378  013264  063140                    KDATI2:         063140
3379  013266  073567                    KDATI3:         073567
3380
3381  013270  010421                    KBUF0:          010421
3382  013272  031463                    KBUF1:          031463
3383  013274  042104                    KBUF2:          042104
3384  013276  021042                    KBUF3:          021042
3385
3386  013300  000000                    KDAT00:         0
3387  013302  000000                    KDAT01:         0
3388  013304  000000                    KDAT02:         0
3389  013306  000000                    KDAT03:         0
3390
3391  013310  177777                    KPAT0:          -1
3392  013312  177777                    KPAT1:          -1
3393  013314  177777                    KPAT2:          -1
3394  013316  177777                    DPAT3:          -1
3395
3396  013320                            KDONE:
3397  013320  104413                            RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
3398                                                                    ;SEE IF THE USER HAS EXPRESSED
```

```
                                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                        ;THE USER TYPED CONTROL G?).


                                ;;*****************************************************************
                                ;*TEST 16       FSRC MODE 2, WITH FD=0, TEST
                                ;*
                                ;* THIS IS A TEST OF FSRC MODE 2 WITH
                                ;* FD=0.  (AUTO INCREMENT)
                                ;*
                                ;;*****************************************************************
013322  000004                  TST16:  SCOPE
013324  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.

013326                          L1:
013326  170011                          SETD                    ;SET DOUBLE MODE

013330  012700  013576                  MOV     #LPAT10,R0
013334  172410                          LDD     (R0),AC0        ;LOAD AC0

013336  012700  013620                  MOV     #LDATI0,R0      ;SET UP THE INPUT
013342  012701  013606                  MOV     #LPAT20,R1      ;DATA
013346  012702  000004                  MOV     #4,R2

013352  012120                  1$:     MOV     (R1)+,(R0)+
013354  077202                          SOB     R2,1$

013356  012700  013620                  MOV     #LDATI0,R0
013362  005003                          CLR     R3
013364  170001                          SETF                    ;CLEAR FD.

013366  172420                  L2:     LDF     (R0)+,AC0
013370  005203                  L3:     INC     R3

013372                          L4:
013372  170011                          SETD                    ;SET FD

013374  012701  013632                  MOV     #LDATO0,R1
013400  174011                          STD     AC0,(R1)        ;PICK UP RESULTS

013402  020027  013624                  CMP     R0,#LDATI2      ;WAS R0 INCREMENTED
013406  001401                          BEQ     1$              ;CORRECTLY BY 4
013410  000421                          BR      LERR1

013412  012737  177777  013624  1$:     MOV     #-1,@#LDATI2
013420  012737  177777  013626          MOV     #-1,@#LDATI3
013426  012702  013620                  MOV     #LDATI0,R2      ;IS DATA CORRECT
013432  012703  013632                  MOV     #LDATO0,R3
013436  012704  000004                  MOV     #4,R4

013442  022223                  L5:     CMP     (R2)+,(R3)+
013444  001401                          BEQ     L6
013446  000427                          BR      LERR2
013450  077404                  L6:     SOB     R4,L5
```

```
3455  013452  000473                          BR      LDONE
3456
3457  013454                          LERR1:                          ;REPORT FAILURE
3458  013454  012737  013366  001236          MOV     #L2,@#$TMP2     ;R0 NOT INCREMENTED
3459  013462  010037  001240                  MOV     R0,@#$TMP3      ;BY 4
3460  013466  012737  013624  001242          MOV     #LDATI2,@#$TMP4
3461  013474  104001                  1$:     ERROR   1
3462  013476  000461                          BR      LDONE
3463
3464  013500                          LERR3:                          ;REPORT DATA FAILURE.
3465  013500  012737  013366  001236          MOV     #L2,@#$TMP2
3466  013506  012737  013620  001240          MOV     #LDATI0,@#$TMP3
3467  013514  012737  013632  001242          MOV     #LDATO0,@#$TMP4
3468  013522  104001                  1$:     ERROR   1
3469  013524  000446                          BR      LDONE
3470
3471  013526  012702  013606          LERR2:  MOV     #LPAT20,R2      ;DID (BUT FD)
3472  013532  012703  013632                  MOV     #LDATO0,R3      ;FAIL.
3473  013536  012704  000004                  MOV     #4,R4
3474  013542  022223                  1$:     CMP     (R2)+,(R3)+
3475  013544  001355                          BNE     LERR3
3476  013546  077403                          SOB     R4,1$
3477  013550  012737  013366  001236          MOV     #L2,@#$TMP2
3478  013556  012737  013620  001240          MOV     #LDATI0,@#$TMP3
3479  013564  012737  013634  001242          MOV     #LDATO1,@#$TMP4
3480  013572  104001                  2$:     ERROR   1
3481  013574  000422                          BR      LDONE
3482
3483  013576  177777          LPAT10: .WORD   -1
3484  013600  177777          LPAT11:         -1
3485  013602  177777          LPAT12:         -1
3486  013604  177777          LPAT13:         -1
3487
3488  013606  052525          LPAT20:         052525
3489  013610  114631          LPAT21:         114631
3490  013612  063142          LPAT22:         063142
3491  013614  073567          LPAT23:         073567
3492  013616  000001                  .WORD   000001
3493  013620  000000          LDATI0:         0
3494  013622  000000          LDATI1:         0
3495  013624  000000          LDATI2:         0
3496  013626  000000          LDATI3:         0
3497  013630  000001                  .WORD   00001
3498  013632  000000          LDATO0:         0
3499  013634  000000          LDATO1:         0
3500  013636  000000          LDATO2:         0
3501  013640  000000          LDATO3:         0
3502
3503  013642                  LDONE:
3504  013642  104413                  RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
3505                                                          ;SEE IF THE USER HAS EXPRESSED
3506                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
3507                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
3508                                                          ;THE USER TYPED CONTROL G?).
3509
3510
```

```
3511                                    ;;*********************************************************************
3512                                    ;*TEST 17       FSRC MODE 2 WITH GR7, IMMEDIATE MODE, TEST
3513                                    ;*
3514                                    ;* THIS IS A TEST OF FSRC MODE 2
3515                                    ;* USING GR7 (THE PC).  THIS IS IMMEDIATE
3516                                    ;* MODE.
3517                                    ;*
3518                                    ;;*********************************************************************
3519  013644  000004                    TST17:  SCOPE
3520
3521  013646                            M1:
3522  013646  170011                           SETD
3523
3524  013650  012700  014142                   MOV     #MPAT10,R0
3525  013654  172410                           LDD     (R0),AC0        ;LOAD BACKROUND
3526                                                                    ;PATTERN INTO AC0.
3527  013656  005004                           CLR     R4
3528  013660  012737  014102  000004           MOV     #MERR3,@#ERRVECT
3529
3530  013666  172427  000000           M15:    LDD     #0,AC0          ;TEST INSTRUCTION
3531          013670                           .=.-2                   ;EFFECTIVELY: 05204 IS PUT IN THE FIRST
3532  013670  005204                           .WORD   5204    ;16 BIT WORD, OR THE ''EXP-FRACTION'' WORD.
3533  013672  005204                    M2:     INC     R4              ;NOTE THAT
3534  013674  005204                    M3:     INC     R4              ;005204=INC R4
3535  013676  005204                    M4:     INC     R4
3536
3537  013700  020427  000003                   CMP     R4,#3           ;SEE IF THE PC
3538  013704  001401                           BEQ     1$              ;WAS INCREMENTED
3539  013706  000443                           BR      MERR0           ;BY 2 DURING THE
3540                                                                    ;INSTRUCTION.  IF
3541                                                                    ;NOT THEN A BAD
3542                                                                    ;CONSTANT WAS GENERATED
3543  013710  012700  014162           1$:     MOV     #MDAT00,R0
3544  013714  174010                           STD     AC0,(R0)        ;GET THE DATA
3545
3546  013716  012700  014162                   MOV     #MDAT00,R0
3547  013722  022720  005204                   CMP     #5204,(R0)+     ;IS THE DATA CORRECT?
3548  013726  001401                           BEQ     M5
3549  013730  000451                           BR      MERR1
3550  013732  012701  000003           M5:     MOV     #3,R1
3551  013736  005720                    M6:     TST     (R0)+
3552  013740  001002                           BNE     M7
3553  013742  077103                           SOB     R1,M6
3554  013744  000512                           BR      MDONE
3555
3556  013746  012700  014162           M7:     MOV     #MDAT00,R0      ;DID (BUT GRM) FAIL?
3557  013752  012701  000004                   MOV     #4,R1
3558  013756  022720  005204           M8:     CMP     #5204,(R0)+
3559  013762  001401                           BEQ     M9
3560  013764  000433                           BR      MERR1
3561  013766  077105                    M9:     SOB     R1,M8
3562
3563  013770                            MERR2:                          ;REPORT FAILURE
3564  013770  012737  013666  001236           MOV     #M15,@#$TMP2    ;OF (BUT GR7)
3565  013776  012737  014152  001240           MOV     #MPAT20,@#$TMP3
3566  014004  012737  014162  001242           MOV     #MDAT00,@#$TMP4
```

```
3567  014012  104001                  1$:     ERROR   1
3568  014014  000466                          BR      MDONE
3569
3570  014016  012705  013672          MERR0:  MOV     #M2,R5          ;REPORT FAILURE
3571  014022  010537  001242                  MOV     R5,@#$TMP4      ;PC INCREMENTED
3572  014026  162704  000003                  SUB     #3,R4
3573  014032  006304                          ASL     R4
3574  014034  160405                          SUB     R4,R5
3575  014036  010537  001240                  MOV     R5,@#$TMP3
3576  014042  012737  013666  001236          MOV     #M15,@#$TMP2
3577  014050  104001                  1$:     ERROR   1
3578  014052  000447                          BR      MDONE
3579
3580  014054                          MERR1:                          ;REPORT DATA
3581  014054  012737  013666  001236          MOV     #M15,@#$TMP2    ;FAILURE
3582  014062  012737  014162  001240          MOV     #MDAT00,@#$TMP3
3583  014070  012737  014152  001242          MOV     #MPAT20,@#$TMP4
3584  014076  104001                  1$:     ERROR   1
3585  014100  000434                          BR      MDONE
3586                                  ;TRAP TO HERE THROUGH 4.
3587  014102  032716  000001          MERR3:  BIT     #1,(SP)         ;SEE IF THE
3588  014106  001002                          BNE     1$              ;TRAP TO 4 OCCURRED
3589  014110  000137  062566                  JMP     @#CPSPUR        ;BECAUSE OF AN
3590                                                                  ;ODD ADDRESS
3591  014114  011637  001240          1$:     MOV     (SP),@#$TMP3    ;IF YES REPORT
3592  014120  012737  013672  001242          MOV     #M2,@#$TMP4     ;BAD CONSTANT
3593  014126  012737  013666  001236          MOV     #M15,@#$TMP2    ;GENERATED
3594  014134  022626                          CMP     (SP)+,(SP)+
3595  014136  104001                  2$:     ERROR   1
3596  014140  000414                          BR      MDONE
3597
3598  014142  177777          MPAT10:         -1
3599  014144  177777          MPAT11:         -1
3600  014146  177777          MPAT12:         -1
3601  014150  177777          MPAT13:         -1
3602
3603  014152  005204          MPAT20:         5204
3604  014154  005204          MPAT21:         5204
3605  014156  005204          MPAT22:         5204
3606  014160  005204          MPAT23:         5204
3607
3608  014162  0C0000          MDAT00:         0
3609  014164  000000          MDAT01:         0
3610  014166  000000          MDAT02:         0
3611  014170  000000          MDAT03:         0
3612
3613  014172                  MDONE:
3614  014172  104413                  RSETUP                          ;GO INITIALIZE THE FPS AND STACK; AND
3615                                                                  ;SEE IF THE USER HAS EXPRESSED
3616                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
3617                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
3618                                                                  ;THE USER TYPED CONTROL G?).
3619
3620
3621                          ;;*****************************************************************
3622                          ;*TEST 20       FSRC MODE 3 TEST
```

```
3623                                    ;*
3624                                    ;* THIS IS A TEST OF FSRC MODE 3, AUTO INCREMENT
3625                                    ;* DEFERRED
3626                                    ;*
3627                                    ;;*****************************************************************
3628  014174  000004                    TST20:  SCOPE
3629
3630  014176                            N1:
3631  014176  170011                            SETD                    ;SET FD MODE
3632
3633  014200  012700  014660                    MOV     #NPAT10,R0
3634  014204  172410                            LDD     (R0),AC0        ;LOAD AC0 WITH A DEFAULT
3635                                                                    ;PATTERN
3636  014206  012700  014646                    MOV     #NPAT20,R0
3637  014212  005003                            CLR     R3
3638  014214  012737  014370  000004           MOV     #NERR0,@#ERRVECT        ;IF A FAILURE OCCURS
3639                                                                    ;IN THE FSRC FLOWS AN
3640                                                                    ;ODD TRAP TO 4 COULD OCCUR
3641  014222  172430                    N2:     LDD     @(R0)+,AC0      ;TEST INSTRUCTION.
3642  014224  005203                    N3:     INC     R3
3643  014226  005203                    N4:     INC     R3
3644
3645  014230  012701  014626                    MOV     #NDAT00,R1
3646  014234  174011                            STD     AC0,(R1)        ;GET THE DATA
3647
3648  014236  020027  014650                    CMP     R0,#NPAT20+2    ;WAS R0 INCREMENTED
3649  014242  001437                            BEQ     N12             ;BY 2?
3650
3651  014244  020027  014656            N5:     CMP     R0,#NPAT20+10   ;FSRC MODE 2?
3652  014250  001001                            BNE     N6
3653  014252  000506                            BR      NERR1
3654
3655  014254  020027  014636            N6:     CMP     R0,#NPAT20-10   ;FSRC MODE 4?
3656  014260  001001                            BNE     N7
3657  014262  000520                            BR      NERR2
3658
3659  014264  020027  014646            N7:     CMP     R0,#NPAT20
3660  014270  001023                            BNE     N11
3661
3662  014272  012702  014626                    MOV     #NDAT00,R2      ;FSRC MODE 0?
3663  014276  012703  000004                    MOV     #4,R3
3664  014302  022227  177777            N8:     CMP     (R2)+,#-1
3665  014306  001002                            BNE     N9
3666  014310  077304                            SOB     R3,N8
3667  014312  000510                            BR      NERR3
3668
3669  014314  012702  014626            N9:     MOV     #NDAT00,R2      ;FSRC MODE 1
3670  014320  012703  014646                    MOV     #NPAT20,R3
3671  014324  012704  000004                    MOV     #4,R4
3672  014330  022223                    N10:    CMP     (R2)+,(R3)+
3673  014332  001002                            BNE     N11
3674  014334  077403                            SOB     R4,N10
3675  014336  000502                            BR      NERR4
3676
3677  014340  000505                    N11:    BR      NERR5
3678
```

```
 3679  014342  012702  014626          N12:    MOV     #NDAT00,R2      ;DATA CORRECT?
 3680  014346  012703  014670                  MOV     #NDAT10,R3
 3681  014352  012704  000004                  MOV     #4,R4
 3682  014356  022223                  N13:    CMP     (R2)+,(R3)+
 3683  014360  001002                          BNE     N14
 3684  014362  077403                          SOB     R4,N13
 3685  014364  000545                          BR      NDONE
 3686
 3687  014366  000504                  N14:    BR      NERR6
 3688
 3689                                  ;IF AN ODD ADDRESS TRAP OCCURS COME HERE
 3690                                  ;TO SEE IF THE FAILURE WAS IN THE FSRC
 3691                                  ;FLOWS
 3692
 3693  014370  022716  014226          NERR0:  CMP     #N4,(SP)        ;FSRC MODE 6 OR 7?
 3694  014374  001412                          BEQ     NERR10
 3695  014376  022716  014224                  CMP     #N3,(SP)
 3696  014402  001402                          BEQ     1$
 3697  014404  000137  062566                  JMP     @#CPSPUR
 3698  014410  020027  014644          1$:     CMP     R0,#NPAT20-2    ;FSRC MODE 5?
 3699  014414  001407                          BEQ     NERR11
 3700  014416  000137  062566                  JMP     @#CPSPUR
 3701
 3702  014422                          NERR10:                         ;WENT TO FSRC
 3703  014422  011637  001236                  MOV     (SP),@#$TMP2    ;MODE 6 OR 7.
 3704  014426  022626                          CMP     (SP)+,(SP)+
 3705  014430  104001                  1$:     ERROR   1
 3706  014432  000522                          BR      NDONE
 3707
 3708  014434  011637  001236          NERR11: MOV     (SP),@#$TMP2    ;WENT TO FSRC
 3709  014440  022626                          CMP     (SP)+,(SP)+     ;MODE 5.
 3710  014442  012737  000627  001244          MOV     #627,@#$TMP5
 3711  014450  012737  000323  001250          MOV     #323,@#$TMP7
 3712  014456  012737  000325  001246          MOV     #325,@#$TMP6
 3713  014464  104001                  1$:     ERROR   1
 3714  014466  000504                          BR      NDONE
 3715  014470  012737  000322  001246  NERR1:  MOV     #322,@#$TMP6    ;FSRC MODE 2.
 3716  014476  012737  000627  001244  NERR20: MOV     #627,@#$TMP5
 3717  014504  012737  000323  001250          MOV     #323,@#$TMP7
 3718  014512  012737  014222  001236          MOV     #N2,@#$TMP2
 3719  014520  104001                  1$:     ERROR   1
 3720  014522  000466                          BR      NDONE
 3721  014524  012737  000324  001246  NERR2:  MOV     #324,@#$TMP6    ;FSRC MODE 4
 3722  014532  000761                          BR      NERR20
 3723  014534  012737  000320  001246  NERR3:  MOV     #320,@#$TMP6    ;FSRC MODE 0
 3724  014542  000755                          BR      NERR20
 3725  014544  012737  000321  001246  NERR4:  MOV     #321,@#$TMP6    ;FSRC MODE 1
 3726  014552  000751                          BR      NERR20
 3727
 3728  014554  010037  001240          NERR5:  MOV     R0,@#$TMP3      ;R0 NOT
 3729  014560  012737  014650  001242          MOV     #NPAT20+2,@#$TMP4       ;INCREMENTED
 3730  014566  012737  014222  001236          MOV     #N2,@#$TMP2     ;PROPERLY.
 3731  014574  104001                  1$:     ERROR   1
 3732  014576  000440                          BR      NDONE
 3733
 3734  014600                          NERR6:                          ;DATA FAILURE.
```

```
3735  014600  012737  014222  001236          MOV     #N2,@#$TMP2
3736  014606  012737  014626  001240          MOV     #NDAT00,@#$TMP3
3737  014614  012737  014670  001242          MOV     #NDATI0,@#$TMP4
3738  014622  104001                  1$:     ERROR   1
3739  014624  000425                          BR      NDONE
3740
3741  014626  000000              NDAT00: .WORD   0
3742  014630  000000              NDAT01:         0
3743  014632  000000              NDAT02:         0
3744  014634  000000              NDAT03:         0
3745
3746  014636  052525  052525  052525          .WORD   52525,52525,52525,52525
3747  014644  052525
3748  014646  014670              NPAT20: .WORD   NDATI0
3749  014650  070707              NPAT21:         070707
3750  014652  070707              NPAT22:         070707
3751  014654  070707              NPAT23:         070707
3752  014656  000001                      .WORD   1
3753  014660  177777              NPAT10: .WORD   -1
3754  014662  177777              NPAT11:         -1
3755  014664  177777              NPAT12:         -1
3756  014666  177777              NPAT13:         -1
3757
3758  014670  010421              NDATI0: .WORD   010421
3759  014672  021042              NDATI1:         021042
3760  014674  031463              NDATI2:         031463
3761  014676  042104              NDATI3:         042104
3762
3763  014700                      NDONE:
3764  014700  104413                  RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
3765                                                          ;SEE IF THE USER HAS EXPRESSED
3766                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
3767                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
3768                                                          ;THE USER TYPED CONTROL G?).
3769
3770
3771                              ;;*****************************************************************
3772                              ;*TEST 21       FSRC MODE 5 TEST
3773                              ;*
3774                              ;* THIS IS A TEST OF FSRC MODE 5, AUTO DECREMENT
3775                              ;* DEFERRED.
3776                              ;*
3777                              ;;*****************************************************************
3778  014702  000004              TST21:  SCOPE
3779
3780  014704                      01:
3781  014704  170011                  SETD                    ;SET FD MODE
3782
3783  014706  012700  015364          MOV     #OPAT10,R0
3784  014712  172410                  LDD     (R0),AC0        ;LOAD AC0 WITH A
3785                                                          ;DEFAULT PATTERN.
3786  014714  012700  015352          MOV     #OPAT21,R0
3787  014720  005003                  CLR     R3
3788  014722  012737  015074  000004  MOV     #OERR0,@#ERRVEC ;IF A FAILURE
3789                                                          ;OCCURS IN THE FSRC
3790                                                          ;FLOWS AN ODD ADDR.
```

```
3791
3792  014730  172450                02:     LDD     @-(R0),AC0      ;TRAP TO 4 MAY OCCUR.
3793  014732  005203                03:     INC     R3              ;TEST INSTRUCTION
3794  014734  005203                04:     INC     R3
3795
3796  014736  012701  015332                MOV     #ODAT00,R1
3797  014742  174011                        STD     AC0,(R1)        ;GET THE DATA
3798
3799  014744  020027  015350                CMP     R0,#OPAT20      ;WAS R0 DECREMENTED
3800  014750  001436                        BEQ     012             ;BY 2?
3801
3802  014752  020027  015362        05:     CMP     R0,#OPAT21+10   ;FSRC MODE 2
3803  014756  001001                        BNE     06
3804  014760  000505                        BR      OERR1
3805
3806  014762  020027  015342        06:     CMP     R0,#OPAT21-10   ;FSRC MODE 4?
3807  014766  001001                        BNE     07
3808  014770  000517                        BR      OERR2
3809
3810  014772  020027  015352        07:     CMP     R0,#OPAT21
3811
3812  014776  012702  015334                MOV     #ODAT01,R2      ;FSRC MODE 0?
3813  015002  012703  000004                MOV     #4,R3
3814  015006  022227  177777        08:     CMP     (R2)+,#-1
3815  015012  001002                        BNE     09
3816  015014  077304                        SOB     R3,08
3817  015016  000510                        BR      OERR3
3818
3819  015020  012702  015332        09:     MOV     #ODAT00,R2      ;FSRC MODE 1?
3820  015024  012703  015352                MOV     #OPAT21,R3
3821  015030  012704  000004                MOV     #4,R4
3822  015034  022223                010:    CMP     (R2)+,(R3)+
3823  015036  001002                        BNE     011
3824  015040  077403                        SOB     R4,010
3825  015042  000502                        BR      OERR4
3826
3827  015044  000505                011:    BR      OERR5
3828
3829  015046  012702  015332        012:    MOV     #ODAT00,R2      ;DATA CORRECT?
3830  015052  012703  015374                MOV     #ODATI0,R3
3831  015056  012704  000004                MOV     #4,R4
3832  015062  022223                013:    CMP     (R2)+,(R3)+
3833  015064  001002                        BNE     014
3834  015066  077403                        SOB     R4,013
3835  015070  000545                        BR      ODONE
3836
3837  015072  000504                014:    BR      OERR6
3838
3839                                ;IF AN ODD ADDRESS TRAP OCCURS COME
3840                                ;HERE TO SEE IF THE FAILURE WAS IN THE
3841                                ;FSRC FLOWS:
3842
3843  015074  022716  014734        OERR0:  CMP     #04,(SP)        ;FSRC MODE 6 OR 7?
3844  015100  001412                        BEQ     OERR10
3845  015102  022716  014732                CMP     #03,(SP)
3846  015106  001402                        BEQ     1$
```

```
3847  015110  000137  062566            JMP     @#CPSPUR
3848  015114  020027  015354    1$:     CMP     R0,#OPAT21+2    ;FSRC MODE 3?
3849  015120  001425                    BEQ     OERR1
3850  015122  000137  062566            JMP     @#CPSPUR
3851
3852  015126                    OERR10:                         ;WENT TO FSRC
3853  015126  011637  001236            MOV     (SP),@#$TMP2    ;MODE 6 OR 7
3854  015132  022626                    CMP     (SP)+,(SP)+
3855  015134  104001            1$:     ERROR   1
3856  015136  000522                    BR      ODONE
3857
3858  015140  011637  001240    OERR11: MOV     (SP),@#$TMP3    ;WENT TO FSRC MODE
3859  015144  022626                    CMP     (SP)+,(SP)+     ;3
3860  015146  012737  000627  001244    MOV     #627,@#$TMP5
3861  015154  012737  000325  001250    MOV     #325,@#$TMP7
3862  015162  012737  000323  001246    MOV     #323,@#$TMP6
3863  015170  104001            1$:     ERROR   1
3864  015172  000504                    BR      ODONE
3865
3866  015174  012737  000322  001246  OERR1:  MOV     #322,@#$TMP6    ;FSRC MODE2
3867  015202  012737  000627  001242  OERR20: MOV     #627,@#$TMP4
3868  015210  012737  000325  001250          MOV     #325,@#$TMP7
3869  015216  012737  014730  001236          MOV     #02,@#$TMP2
3870  015224  104001            1$:     ERROR   1
3871  015226  000466                    BR      ODONE
3872  015230  012737  000324  001246  OERR2:  MOV     #324,@#$TMP6    ;FSRC MODE 4
3873  015236  000761                    BR      OERR20
3874  015240  012737  000320  001246  OERR3:  MOV     #320,@#$TMP6    ;FSRC MODE 0
3875  015246  000755                    BR      OERR20
3876  015250  012737  000321  001246  OERR4:  MOV     #321,@#$TMP6    ;FSRC MODE 1
3877  015256  000751                    BR      OERR20
3878
3879  015260  010037  001240  OERR5:  MOV     R0,@#$TMP3      ;R0 NOT DECREMENTED
3880  015264  012737  015350  001242          MOV     #OPAT20,@#$TMP4 ;PROPERLY
3881  015272  012737  014734  001236          MOV     #04,@#$TMP2
3882  015300  104001            1$:     ERROR   1
3883  015302  000440                    BR      ODONE
3884
3885  015304                    OERR6:                          ;DATA FAILURE
3886  015304  012737  014730  001236          MOV     #02,@#$TMP2
3887  015312  012737  015332  001240          MOV     #ODAT00,@#$TMP3
3888  015320  012737  015374  001242          MOV     #ODATI0,@#$TMP4
3889  015326  104001            1$:     ERROR   1
3890  015330  000425                    BR      ODONE
3891
3892  015332  000000            ODAT00: .WORD   0
3893  015334  000000            ODAT01:         0
3894  015336  000000            ODAT02:         0
3895  015340  000000            ODAT03:         0
3896
3897  015342  052525  052525  052525          .WORD   52525,52525,52525
3898  015350  015374            OPAT20: .WORD   ODATI0
3899  015352  070707            OPAT21: 070707
3900  015354  070707            OPAT22: 070707
3901  015356  070707            OPAT23: 070707
3902  015360  070707            OPAT24: 070707
```

```
3903  015362  000001                          .WORD   1
3904  015364  177777          OPAT10: .WORD   -1
3905  015366  177777          OPAT11:         -1
3906  015370  177777          OPAT12:         -1
3907  015372  177777          OPAT13:         -1
3908
3909  015374  073567          ODAT10: .WORD   73567
3910  015376  004210          ODAT11:         004210
3911  015400  114631          ODAT12:         114631
3912  015402  125252          ODAT13:         125252
3913
3914  015404                  ODONE:
3915  015404  104413                  RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
3916                                                          ;SEE IF THE USER HAS EXPRESSED
3917                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
3918                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
3919                                                          ;THE USER TYPED CONTROL G?).
3920
3921
3922                          ;;*****************************************************************
3923                          ;*TEST 22        FSRC MODE 6 TEST
3924                          ;*
3925                          ;* THIS IS A TEST OF FSRC MODE 6, INDEX MODE
3926                          ;*
3927                          ;;*****************************************************************
3928  015406  000004          TST22:  SCOPE
3929
3930  015410                  P1:
3931  015410  170011                  SETD                    ;SET FD MODE
3932
3933  015412  012700  016030          MOV     #PPAT10,R0
3934  015416  172410                  LDD     (R0),AC0        ;LOAD A DEFAULT PATTERN
3935                                                          ;INTO AC0
3936  015420  012737  015526  000004  MOV     #PERR0,@#ERRVECT        ;IF THE (BUT FSRC) FORQ
3937                                                          ;FAILS AN ODD ADDRESS TRAP
3938  015426  012700  015577          MOV     #PDAT10-241,R0  ;COULD OCCUR.
3939
3940  015432  172460  000241  P2:     LDD     241(R0),AC0
3941          015434          P3=P2+2
3942
3943  015436  012701  016050  P4:     MOV     #PDAT00,R1
3944  015442  174011                  STD     AC0,(R1)        ;GET THE DATA
3945  015444  012703  000004          MOV     #4,R3
3946  015450  012702  016040          MOV     #PDAT10,R2
3947  015454  012701  016050          MOV     #PDAT00,R1
3948  015460  022221          P5:     CMP     (R2)+,(R1)+     ;CHECK THE DATA
3949  015462  001007                  BNE     P6
3950  015464  077303                  SOB     R3,P5
3951  015466  022700  015577          CMP     #PDAT10-241,R0  ;R0 CORRECT?
3952  015472  001401                  BEQ     1$
3953  015474  000512                  BR      PERR21
3954  015476  000137  016060  1$:     JMP     @#PDONE
3955
3956  015502  012701  016050  P6:     MOV     #PDAT00,R1
3957  015506  012703  000004          MOV     #4,R3
3958  015512  022721  177777  P7:     CMP     #-1,(R1)+       ;WAS IT FSRC MODE 0?
```

```
3959  015516  001401                          BEQ     P8
3960  015520  000512                          BR      PERR1
3961  015522  077305                  P8:     SOB     R3,P7
3962  015524  000523                          BR      PERR2
3963                                  ;TRAP TO HERE ON AN ODD ADDRESS
3964  015526  021627  015434          PERR0:  CMP     (SP),#P3
3965  015532  001411                          BEQ     PERR11
3966  015534  021627  015436                  CMP     (SP),#P4        ;WAS IT FSRC MODE 7?
3967  015540  001402                          BEQ     PERR10
3968  015542  000137  062566                  JMP     @#CPSPUR
3969
3970  015546  012737  000327  001246  PERR10: MOV     #327,@#$TMP6
3971  015554  000443                          BR      PERR17
3972  015556  022700  015577          PERR11: CMP     #PDATI0-241,R0  ;WAS IT FSRC MODE 1
3973  015562  001004                          BNE     PERR12
3974  015564  012737  000321  001246          MOV     #321,@#$TMP6
3975  015572  000434                          BR      PERR17
3976  015574  022700  015607          PERR12: CMP     #PDATI0-241+10,R0       ;WAS IT FSRC MODE 2
3977  015600  001004                          BNE     PERR13
3978  015602  012737  000322  001246          MOV     #322,@#$TMP6
3979  015610  000425                          BR      PERR17
3980  015612  022700  015601          PERR13: CMP     #PDATI0-241+2,R0        ;WAS IT FSRC MODE 3
3981  015616  001004                          BNE     PERR14
3982  015620  012737  000323  001246          MOV     #323,@#$TMP6
3983  015626  000416                          BR      PERR17
3984  015630  022700  015567          PERR14: CMP     #PDATI0-241-10,R0       ;WAS IT FSRC MODE 4
3985  015634  001004                          BNE     PERR15
3986  015636  012737  000324  001246          MOV     #324,@#$TMP6
3987  015644  000407                          BR      PERR17
3988  015646  022700  015575          PERR15: CMP     #PDATI0-241-2,R0        ;WAS IT FSRC MODE 5
3989  015652  001401                          BEQ     PERR16
3990  015654  000416                          BR      PERR20
3991  015656  012737  000325  001246  PERR16: MOV     #325,@#$TMP6
3992
3993  015664  012737  000627  001244  PERR17: MOV     #627,@#$TMP5    ;REPORT FSRC
3994  015672  012737  000326  001250          MOV     #326,@#$TMP7    ;FLOWS FAILURE.
3995  015700  011637  001236                  MOV     (SP),@#$TMP2
3996  015704  022626                          CMP     (SP)+,(SP)+
3997  015706  104001                  1$:     ERROR   1
3998  015710  000463                          BR      PDONE
3999
4000  015712  011637  001236          PERR20: MOV     (SP),@#$TMP2    ;REPORT R0 AFFECTED
4001  015716  022626                          CMP     (SP)+,(SP)+
4002  015720  000403                          BR      PERR22
4003  015722  012737  015432  001236  PERR21: MOV     #P2,@#$TMP2
4004  015730                          PERR22:
4005  015730  010037  001240                  MOV     R0,@#$TMP3
4006  015734  012737  015577  001242          MOV     #PDATI0-241,@#$TMP4
4007  015742  104001                  1$:     ERROR   1
4008  015744  000445                          BR      PDONE
4009
4010  015746                          PERR1:                          ;DATA FAILURE.
4011  015746  012737  015432  001236          MOV     #P2,@#$TMP2
4012  015754  012737  016040  001240          MOV     #PDATI0,@#$TMP3
4013  015762  012737  016050  001242          MOV     #PDAT00,@#$TMP4
4014  015770  104001                  1$:     ERROR   1
```

```
 4015  015772  000432                          BR      PDONE
 4016
 4017  015774                          PERR2:                          ;FSRC FAILURE TO
 4018  015774  012737  015432  001236          MOV     #P2,@#$TMP2     ;MODE 0
 4019  016002  012737  000627  001244          MOV     #627,@#$TMP5
 4020  016010  012737  000326  001250          MOV     #326,@#$TMP7
 4021  016016  012737  000320  001246          MOV     #320,@#$TMP6
 4022  016024  104001                  1$:     ERROR   1
 4023  016026  000414                          BR      PDONE
 4024
 4025  016030  177777                  PPAT10: .WORD   -1
 4026  016032  177777                  PPAT11:         -1
 4027  016034  177777                  PPAT12:         -1
 4028  016036  177777                  PPAT13:         -1
 4029
 4030  016040  010421                  PDAT10: .WORD   010421
 4031  016042  031463                  PDAT11:         031463
 4032  016044  052525                  PDAT12:         052525
 4033  016046  073567                  PDAT13:         073567
 4034
 4035  016050  000000                  PDAT00: .WORD   0
 4036  016052  000000                  PDAT01:         0
 4037  016054  000000                  PDAT02:         0
 4038  016056  000000                  PDAT03:         0
 4039
 4040  016060                          PDONE:
 4041  016060  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 4042                                                                  ;SEE IF THE USER HAS EXPRESSED
 4043                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 4044                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 4045                                                                  ;THE USER TYPED CONTROL G?).
 4046
 4047
 4048                                  ;;*****************************************************************
 4049                                  ;*TEST 23       FSRC MODE 7 TEST
 4050                                  ;*
 4051                                  ;* THIS IS A TEST OF FSRC MODE 7, INDEX
 4052                                  ;* DEFERRED MODE.
 4053                                  ;*
 4054                                  ;;*****************************************************************
 4055  016062  000004                  TST23:  SCOPE
 4056
 4057  016064                          Q1:
 4058  016064  170011                          SETD
 4059
 4060  016066  012700  016520                  MOV     #QPAT10,R0
 4061  016072  172410                          LDD     (R0),AC0        ;LOAD A DEFAULT
 4062                                                                  ;PATTERN INTO AC0
 4063  016074  012737  016226  000004          MOV     #QERR0,@#ERRVECT        ;IF THE (BUT FSRC)
 4064                                                                  ;FORK FAILS AN
 4065                                                                  ;ODD ADR TRAP COULD
 4066                                                                  ;OCCUR
 4067  016102  012700  016267                  MOV     #QPAT20-241,R0
 4068
 4069  016106  172470  000241          Q2:     LDD     @241(R0),AC0
 4070          016110                  Q3=Q2+2
```

```
 4071
 4072  016112  012701  016540          Q4:     MOV     #QDAT00,R1
 4073  016116  174011                          STD     AC0,(R1)        ;GET THE DATA
 4074
 4075  016120  012703  000004                  MOV     #4,R3
 4076  016124  012704  016540                  MOV     #QDAT00,R4
 4077  016130  012705  016550                  MOV     #QDATI0,R5
 4078  016134  022425                  Q5:     CMP     (R4)+,(R5)+     ;CHECK THE DATA
 4079  016136  001007                          BNE     Q6
 4080  016140  077303                          SOB     R3,Q5
 4081
 4082  016142  022700  016267                  CMP     #QPAT20-241,R0  ;CHECK R0.
 4083  016146  001401                          BEQ     1$
 4084  016150  000514                          BR      QERR21
 4085  016152  000137  016560          1$:     JMP     @#QDONE
 4086
 4087  016156  012701  016540          Q6:     MOV     #QDAT00,R1
 4088  016162  012703  000004                  MOV     #4,R3
 4089  016166  022721  177777          Q7:     CMP     #-1,(R1)+       ;WAS IT FSRC MODE 0?
 4090  016172  001002                          BNE     Q8
 4091  016174  077304                          SOB     R3,Q7
 4092  016176  000513                          BR      QERR2
 4093
 4094  016200  012701  016530          Q8:     MOV     #QPAT20,R1
 4095  016204  012702  016540                  MOV     #QDAT00,R2
 4096  016210  012703  000004                  MOV     #4,R3
 4097  016214  022122                  Q9:     CMP     (R1)+,(R2)+     ;WAS IT FSRC 6
 4098  016216  001401                          BEQ     Q10             ;OR DATA FAILURE
 4099  016220  000524                          BR      QERR1
 4100  016222  077304                  Q10:    SOB     R3,Q9
 4101  016224  000504                          BR      QERR3
 4102
 4103                                  ;TRAP TO HERE ON AN ODD ADR FAILURE
 4104
 4105  016226  021627  015434          QERR0:  CMP     (SP),#P3
 4106  016232  000137  062566                  JMP     @#CPSPUR
 4107
 4108  016236  022700  016267          QERR11: CMP     #QPAT20-241,R0  ;WAS IT FSRC
 4109  016242  001004                          BNE     QERR12          ;MODE 1?
 4110  016244  012737  000321  001246          MOV     #321,@#$TMP6
 4111  016252  000434                          BR      QERR17
 4112  016254  022700  016277          QERR12: CMP     #QPAT20-241+10,R0       ;WAS IT FSRC
 4113  016260  001004                          BNE     QERR13          ;MODE 2?
 4114  016262  012737  000322  001246          MOV     #322,@#$TMP6
 4115  016270  000425                          BR      QERR17
 4116  016272  022700  016271          QERR13: CMP     #QPAT20-241+2,R0        ;WAS IT FSRC
 4117  016276  001004                          BNE     QERR14          ;MODE 3?
 4118  016300  012737  000323  001246          MOV     #323,@#$TMP6
 4119  016306  000416                          BR      QERR17
 4120  016310  022700  016257          QERR14: CMP     #QPAT20-241-10,R0       ;WAS IT FSRC
 4121  016314  001004                          BNE     QERR15          ;MODE 4
 4122  016316  012737  000324  001246          MOV     #324,@#$TMP6
 4123  016324  000407                          BR      QERR17
 4124
 4125  016326  022700  016265          QERR15: CMP     #QPAT20-241-2,R0        ;WAS IT FSRC
 4126  016332  001401                          BEQ     QERR16          ;MODE 5
```

```
4127  016334  000416                          BR      QERR20
4128
4129  016336  012737  000325  001246  QERR16: MOV     #325,@#$TMP6
4130
4131  016344  012737  000627  001244  QERR17: MOV     #627,@#$TMP5    ;REPORT FSRC FAILURE
4132  016352  012737  000327  001250          MOV     #327,@#$TMP7
4133  016360  011637  001236                  MOV     (SP),@#$TMP2
4134  016364  022626                          CMP     (SP)+,(SP)+
4135  016366  104001                  1$:     ERROR   1
4136  016370  000473                          BR      QDONE
4137
4138  016372  011637  001236          QERR20: MOV     (SP),@#$TMP2    ;REPORT R0 AFFECTED.
4139  016376  022626                          CMP     (SP)+,(SP)+
4140  016400  000403                          BR      QERR22
4141  016402  012737  016106  001236  QERR21: MOV     #Q2,@#$TMP2
4142  016410                          QERR22:
4143  016410  010037  001240                  MOV     R0,@#$TMP3
4144  016414  012737  016267  001242          MOV     #QPAT20-241,@#$TMP4
4145  016422  104001                  1$:     ERROR   1
4146  016424  000455                          BR      QDONE
4147
4148  016426  012737  000320  001246  QERR2:  MOV     #320,@#$TMP6    ;WENT TO FSRC
4149  016434  000403                          BR      QERR4           ;MODE 0
4150  016436  012737  000326  001246  QERR3:  MOV     #326,@#$TMP6    ;WENT TO FSRC
4151                                                                  ;MODE 6
4152  016444  012737  000627  001244  QERR4:  MOV     #627,@#$TMP5
4153  016452  012737  000327  001250          MOV     #327,@#$TMP7
4154  016460  012737  016106  001236          MOV     #Q2,@#$TMP2
4155  016466  104001                  1$:     ERROR   1
4156  016470  000433                          BR      QDONE
4157
4158  016472                          QERR1:                          ;DATA FAILURE
4159  016472  012737  016106  001236          MOV     #Q2,@#$TMP2
4160  016500  012737  016550  001240          MOV     #QDATI0,@#$TMP3
4161  016506  012737  016540  001242          MOV     #QDAT00,@#$TMP4
4162  016514  104001                  1$:     ERROR   1
4163  016516  000420                          BR      QDONE
4164
4165  016520  177777                  QPAT10: .WORD   -1
4166  016522  177777                  QPAT11:         -1
4167  016524  177777                  QPAT12:         -1
4168  016526  177777                  QPAT13:         -1
4169
4170  016530  016550                  QPAT20: .WORD   QDATI0
4171  016532  052525                  QPAT21:         52525
4172  016534  052525                  QPAT22:         52525
4173  016536  052525                  QPAT23:         52525
4174
4175  016540  000000                  QDAT00: .WORD   0
4176  016542  000000                  QDAT01:         0
4177  016544  000000                  QDAT02:         0
4178  016546  000000                  QDAT03:         0
4179
4180  016550  073567                  QDATI0: .WORD   073567
4181  016552  052525                  QDATI1: .WORD   052525
4182  016554  031463                  QDATI2: .WORD   031463
```

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 4183  016556  010421                  QDATI3: .WORD   010421
 4184
 4185  016560                          QDONE:
 4186  016560  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 4187                                                                  ;SEE IF THE USER HAS EXPRESSED
 4188                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 4189                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 4190                                                                  ;THE USER TYPED CONTROL G?).
 4191
 4192                                  ;;*********************************************************************
 4193                                  ;*TEST 24       (BUT EZBT Y8),(BUT ENBT) AND (BUT FIUV) TEST
 4194                                  ;*
 4195                                  ;* LOAD INSTRUCTION FLOWS.
 4196                                  ;* EACH OF THE PATTERNS:
 4197                                  ;*                0
 4198                                  ;*                +NUM
 4199                                  ;*                -NUM
 4200                                  ;*                -0
 4201                                  ;* IS LOADED TWICE, ONCE WITH AC>0 THEN
 4202                                  ;* WITH AC=0.  AFTER EACH LOAD THE FPS IS
 4203                                  ;* CHECK TO INSURE THAT CONTROL WAS PASSED
 4204                                  ;* THROUGH WITH THE FORKS PROPERLY.
 4205                                  ;*
 4206                                  ;;*********************************************************************
 4207  016562  000004                  TST24:  SCOPE
 4208  016564  005037  017662                  CLR     @#UFLAG
 4209  016570  012700  017612                  MOV     #UPAT00,R0      ;SET UP AC#0 DATA.
 4210  016574  012701  000004                  MOV     #4,R1
 4211  016600  012720  177777          U0:     MOV     #-1,(R0)+
 4212  016604  077103                          SOB     R1,U0
 4213
 4214  016606  012737  000033  017664          MOV     #033,@#UTMP1
 4215  016614  012737  000023  017666          MOV     #023,@#UTMP2
 4216  016622  012737  017342  000244          MOV     #UERR0,@#FPVECT ;IN CASE (BUT FIUV FAILS)
 4217  016630                          U1:
 4218  016630  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4219  016632  012700  000200                  MOV     #200,R0
 4220  016636  170100                          LDFPS   R0
 4221  016640  012700  017612                  MOV     #UPAT00,R0      ;LOAD AC0
 4222  016644  172410                          LDD     (R0),AC0
 4223  016646  013737  017664  017670          MOV     @#UTMP1,@#UROM1
 4224  016654  012737  000001  017672          MOV     #001,@#UROM2
 4225  016662  012737  000254  017674          MOV     #254,@#UROM3
 4226
 4227  016670  012700  017622                  MOV     #UPAT10,R0      ;LOAD 0 INTO AC0
 4228  016674  172410                  U2:     LDD     (R0),AC0
 4229  016676  010037  001252                  MOV     R0,@#$TMP10
 4230  016702  012737  016674  001236          MOV     #U2,@#$TMP2
 4231
 4232  016710  012704  000204                  MOV     #204,R4         ;SEE IF FPS IS CORRECT
 4233  016714  170205                          STFPS   R5
 4234
 4235  016716  020405                          CMP     R4,R5
 4236  016720  001402                          BEQ     U3
 4237  016722  000137  017366                  JMP     @#UERR1
 4238
```

```
4239  016726                          U3:
4240  016726  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4241  016730  012700  000200                MOV     #200,R0
4242  016734  170100                        LDFPS   R0
4243
4244  016736  012700  017612                MOV     #UPAT00,R0      ;LOAD AC0
4245  016742  172410                        LDD     (R0),AC0
4246  016744  013737  017666  017670        MOV     @#UTMP2,@#UROM1
4247  016752  012737  000003  017672        MOV     #003,@#UROM2
4248  016760  012737  000054  017674        MOV     #054,@#UROM3
4249
4250  016766  012700  017632                MOV     #UPAT20,R0      ;LOAD A POSITIVE NUMBER
4251                                                                  ;INTO AC0
4252  016772  172410                  U4:   LDD     (R0),AC0
4253  016774  010037  001252                MOV     R0,@#$TMP10
4254  017000  012737  016772  001236        MOV     #U4,@#$TMP2
4255  017006  012704  000200                MOV     #200,R4         ;FPS CORRECT?
4256  017012  170205                        STFPS   R5
4257
4258  017014  020405                        CMP     R4,R5
4259  017016  001402                        BEQ     U5
4260  017020  000137  017452                JMP     @#UERR2
4261  017024                          U5:
4262  017024  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4263  017026  012700  000200                MOV     #200,R0
4264  017032  170100                        LDFPS   R0
4265  017034  012700  017612                MOV     #UPAT00,R0      ;LOAD AC0
4266  017040  172410                        LDD     (R0),AC0
4267  017042  013737  017666  017670        MOV     @#UTMP2,@#UROM1
4268  017050  012737  000403  017672        MOV     #403,@#UROM2
4269  017056  012737  000056  017674        MOV     #056,@#UROM3
4270  017064  012700  017642                MOV     #UPAT30,R0      ;LOAD A NEGATIUE
4271                                                                  ;NUMBER INTO AL0
4272  017070  172410                  U6:   LDD     (R0),AC0
4273  017072  010037  001252                MOV     R0,@#$TMP10
4274  017076  012737  017070  001236        MOV     #U6,@#$TMP2
4275  017104  012704  000210                MOV     #210,R4         ;FPS CORRECT
4276  017110  170205                        STFPS   R5
4277  017112  020405                        CMP     R4,R5
4278  017114  001402                        BEQ     U7
4279  017116  000137  017452                JMP     @#UERR2
4280  017122                          U7:
4281  017122  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4282  017124  012700  000200                MOV     #200,R0
4283  017130  170100                        LDFPS   R0
4284  017132  012700  017612                MOV     #UPAT00,R0      ;LOAD AC0
4285  017136  172410                        LDD     (R0),AC0
4286  017140  013737  017664  017670        MOV     @#UTMP1,@#UROM1
4287  017146  012737  000401  017672        MOV     #401,@#UROM2
4288  017154  012737  000256  017674        MOV     #256,@#UROM3
4289  017162  012700  017652                MOV     #UPAT40,R0      ;LOAD -0 INTO AC0
4290  017166  172410                  U10:  LDD     (R0),AC0
4291  017170  000240                  U11:  NOP                     ;TRAP FROM HERE IF
4292  017172  010037  001252                MOV     R0,@#$TMP10
4293  017176  012737  017166  001236        MOV     #U10,@#$TMP2    ;(BUT FIUV) FAULS!
4294  017204  012704  000214                MOV     #214,R4         ;SEE IF FPS IS CORRECT.
```

```
4295  017210  170205                        STFPS   R5
4296  017212  020405                        CMP     R4,R5
4297  017214  001402                        BEQ     U12
4298  017216  000137  017366                JMP     @#UERR1
4299  017222  005737  017662        U12:    TST     @#UFLAG ;SEE IF ALL THE PATTERNS
4300  017226  001021                        BNE     U14             ;HAVE BEEN TEST WITH
4301                                                                ;BOTH AC NOT EQUAL TO 0 AND AC=0
4302  017230  012700  017612                MOV     #UPAT00,R0      ;IF NOT GO BACK AND
4303  017234  012701  000004                MOV     #4,R1           ;CHECK THEM WITH AC=0
4304  017240  005020                U13:    CLR     (R0)+
4305  017242  077102                        SOB     R1,U13
4306  017244  012737  177777  017662        MOV     #-1,@#UFLAG
4307  017252  012737  000233  017664        MOV     #233,@#UTMP1
4308  017260  012737  000223  017666        MOV     #223,@#UTMP2
4309  017266  000137  016630                JMP     @#U1
4310  017272                        U14:
4311  017272  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4312
4313  017274  012737  017536  000244        MOV     #UERR3,@#FPVECT ;NOW SEE IF A TRAP CAN BE FORCED BY SETTING FIUV AND LOADING -0
4314  017302  012700  004200                MOV     #4200,R0        ;SET FD AND FIUV
4315  017306  170100                        LDFPS   R0
4316  017310  012700  017612                MOV     #UPAT00,R0      ;SET UP AC0
4317  017314  172410                        LDD     (R0),AC0
4318  017316  012700  017652                MOV     #UPAT40,R0      ;LOAD -0
4319  017322  172410                U15:    LDD     (R0),AC0        ;SHOULD TRAP TO 244
4320  017324  170000                U16:    CFCC
4321  017326  000240                        NOP
4322  017330  012737  017322  001236        MOV     #U15,@#$TMP2    ;REPORT ERROR.
4323                                                                ;DIDN'T TRAP
4324  017336  104001                1$:     ERROR   1               ;(BUT FIUV) FAILED.
4325  017340  000556                        BR      UDONE
4326
4327                                        ;TRAPPED TO 244.  DID (BUT FIUV) FAIL?
4328  017342  021627  017170        UERR0:  CMP     (SP),#U11
4329  017346  001402                        BEQ     1$
4330  017350  000137  062534                JMP     @#FPSPUR
4331  017354  011637  001236        1$:     MOV     (SP),@#$TMP2
4332  017360  022626                        CMP     (SP)+,(SP)+
4333  017362  104001                2$:     ERROR   1
4334  017364  000544                        BR      UDONE
4335
4336                                        ;COME HERE TO ANALYZE FPS ERRORS
4337
4338  017366  032705  000004        UERR1:  BIT     #4,R5
4339  017372  001432                        BEQ     UERR20
4340  017374  012737  000443  001244  UERR10: MOV     #443,@#$TMP5
4341  017402  013703  017674                MOV     @#UROM3,R3
4342  017406  010337  001250                MOV     R3,@#$TMP7
4343  017412  032703  000200                BIT     #200,R3
4344  017416  001403                        BEQ     1$
4345  017420  042703  000200                BIC     #200,R3
4346  017424  000402                        BR      2$
4347  017426  052703  000200        1$:     BIS     #200,R3
4348  017432  010337  001246        2$:     MOV     R3,@#$TMP6
4349  017436  010537  001240        UERR11: MOV     R5,@#$TMP3
4350  017442  010437  001242                MOV     R4,@#$TMP4
```

```
 4351  017446  104001                    1$:     ERROR   1
 4352  017450  000512                            BR      UDONE
 4353  017452  032705  000004            UERR2:  BIT     #4,R5
 4354  017456  001746                            BEQ     UERR10
 4355  017460  013737  017670  001244    UERR20: MOV     @#UROM1,@#$TMP5
 4356  017466  013703  017672                    MOV     @#UROM2,R3
 4357  017472  010337  001250                    MOV     R3,@#$TMP7
 4358  017476  032703  000400                    BIT     #400,R3
 4359  017502  001403                            BEQ     1$
 4360  017504  042703  000400                    BIC     #400,R3
 4361  017510  000402                            BR      2$
 4362  017512  052703  000400            1$:     BIS     #400,R3
 4363  017516  010337  001246            2$:     MOV     R3,@#$TMP6
 4364  017522  010537  001240            UERR21: MOV     R5,@#$TMP3
 4365  017526  010437  001242                    MOV     R4,@#$TMP4
 4366  017532  104001                    1$:     ERROR   1
 4367  017534  000460                            BR      UDONE
 4368
 4369                                    ;INTERRUPT HERE WHEN FIUV SET AND ATTEMPTED TO LOAD-0
 4370  017536  021627  017324            UERR3:  CMP     (SP),#U16
 4371  017542  001402                            BEQ     1$
 4372  017544  000137  062534                    JMP     @#FPSPUR
 4373  017550  022626                    1$:     CMP     (SP)+,(SP)+
 4374  017552  005000                            CLR     R0
 4375  017554  170300                            STST    R0                      ;GET FEC.
 4376  017556  022700  000014                    CMP     #14,R0                  ;CORRECT
 4377  017562  001001                            BNE     UERR4
 4378  017564  000444                            BR      UDONE
 4379  017566  012737  017322  001236  UERR4:   MOV     #U15,@#$TMP2
 4380  017574  012737  000012  001242            MOV     #12,@#$TMP4
 4381  017602  010037  001240                    MOV     R0,@#$TMP3
 4382  017606  104001                    1$:     ERROR   1
 4383  017610  000432                            BR      UDONE
 4384  017612  000000                    UPAT00: .WORD   0
 4385  017614  000000                    UPAT01:         0
 4386  017616  000000                    UPAT02:         0
 4387  017620  000000                    UPAT03:         0
 4388
 4389  017622  000000                    UPAT10: .WORD   0               ;0
 4390  017624  000000                    UPAT11:         0
 4391  017626  000000                    UPAT12:         0
 4392  017630  000000                    UPAT13:         0
 4393
 4394  017632  010421                    UPAT20: .WORD   010421          ;POS NUM
 4395  017634  114631                    UPAT21:         114631
 4396  017636  125252                    UPAT22:         125252
 4397  017640  177777                    UPAT23:         177777
 4398
 4399  017642  114631                    UPAT30:         114631          ;NEG NUM
 4400  017644  135673                    UPAT31:         135673
 4401  017646  146314                    UPAT32:         146314
 4402  017650  167356                    UPAT33:         167356
 4403
 4404  017652  100000                    UPAT40:         100000          ;NEG ZERO
 4405  017654  000000                    UPAT41:         0
 4406  017656  000000                    UPAT42:         0
```

```
 4407  017660  000000                    UPAT43:         0
 4408
 4409  017662  000000                    UFLAG:  .WORD   0
 4410  017664  000000                    UTMP1:          0
 4411  017666  000000                    UTMP2:          0
 4412  017670  000000                    UROM1:          0
 4413  017672  000000                    UROM2:          0
 4414  017674  000000                    UROM3:          0
 4415  017676                            UDONE:
 4416
 4417
 4418                                    ;;*******************************************************************
 4419                                    ;*TEST 25       ADDF,ADDD,SUBF AND SUBD WITH FSRC=AC=0 TEST
 4420
 4421                                    ;*
 4422                                    ;* THIS IS A TEST OF ADD AND SUB WITH FSRC=AC=0
 4423                                    ;*
 4424
 4425                                    ;;*******************************************************************
 4426  017676  000004                    TST25:  SCOPE
 4427  017700                            W1:
 4428  017700  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4429  017702  012700  000200                    MOV     #200,R0
 4430  017706  170100                            LDFPS   R0              ;SET DOUBLE MODE
 4431  017710  012700  020364                    MOV     #WPAT00,R0      ;LOAD AC0=:
 4432  017714  172410                            LDD     (R0),AC0
 4433  017716  012737  017730  001236            MOV     #W2,@#$TMP2     ;SAVE FP INSTRUCTION
 4434  017724  012700  020364                    MOV     #WPAT00,R0
 4435  017730  172010                    W2:     ADDD    (R0),AC0        ;TEST INSTRUCTION. ADD ITSELF
 4436  017732  170205                            STFPS   R5              ;GET FPS
 4437  017734  170011                            SETD                    ;SET DOUBLE MODE
 4438  017736  012700  020364                    MOV     #WPAT00,R0
 4439  017742  174010                            STD     AC0,(R0)        ;GET THE RESULT
 4440  017744  012701  020364                    MOV     #WPAT00,R1
 4441  017750  012702  000004                    MOV     #4,R2
 4442  017754  022021                    W3:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT
 4443  017756  001403                            BEQ     W4
 4444                                                                    ;NO
 4445  017760  104002                    1$:     ERROR   2
 4446  017762  000137  020404                    JMP     @#WDONE
 4447  017766  077206                    W4:     SOB     R2,W3
 4448  017770  022705  000204                    CMP     #204,R5         ;IS FPS CORRECT
 4449  017774  001410                            BEQ     W5
 4450                                                                    ;NO
 4451  017776  012737  000204  001242            MOV     #204,@#$TMP4
 4452  020004  010537  001240                    MOV     R5,@#$TMP3
 4453  020010  104001                    1$:     ERROR   1
 4454  020012  000137  020404                    JMP     @#WDONE
 4455  020016                            W5:
 4456  020016  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4457  020020  012700  000200                    MOV     #200,R0
 4458  020024  170100                            LDFPS   R0              ;SET DOUBLE MODE
 4459  020026  012700  020364                    MOV     #WPAT00,R0      ;LOAD AC0=0
 4460  020032  172410                            LDD     (R0),AC0
 4461  020034  012737  020052  001236            MOV     #W6,@#$TMP2
 4462  020042  005000                            CLR     R0
```

```
 4463  020044  170100                          LDFPS   R0              ;GO TO FLOATING MODE
 4464  020046  012700  020364                  MOV     #WPAT00,R0
 4465  020052  172010                  W6:     ADDF    (R0),AC0        ;TEST INSTRUCTION
 4466  020054  170205                          STFPS   R5              ;GET FPS
 4467  020056  170011                          SETD                    ;RESET TO DOUBLE MODE
 4468  020060  012700  020364                  MOV     #WPAT00,R0
 4469  020064  174010                          STD     AC0,(R0)        ;GET THE RESULT
 4470  020066  012701  020364                  MOV     #WPAT00,R1
 4471  020072  012702  000004                  MOV     #4,R2
 4472  020076  022021                  W7:     CMP     (R0)+,(R1)+     ;WAS THE RESULT
 4473  020100  001402                          BEQ     W10             ;NO. REPORT FAILURE.
 4474  020102  104002                  1$:     ERROR   2
 4475  020104  000537                          BR      WDONE
 4476  020106  077205                  W10:    SOB     R2,W7
 4477  020110  022705  000004                  CMP     #4,R5           ;WAS FPS CORRECT
 4478  020114  001407                          BEQ     W11
 4479                                                                  ;INCORRECT FPS.
 4480  020116  012737  000004  001242          MOV     #4,@#$TMP4
 4481  020124  010537  001240                  MOV     R5,@#$TMP3
 4482  020130  104002                  1$:     ERROR   2
 4483  020132  000524                          BR      WDONE
 4484  020134                          W11:
 4485  020134  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4486  020136  012700  000200                  MOV     #200,R0
 4487  020142  170100                          LDFPS   R0              ;SET DOUBLE MODE
 4488  020144  012700  020364                  MOV     #WPAT00,R0      ;LOAD AC0=0
 4489  020150  172410                          LDD     (R0),AC0
 4490  020152  012737  020164  001236          MOV     #W12,@#$TMP2
 4491  020160  012700  020364                  MOV     #WPAT00,R0
 4492  020164  173010                  W12:    SUBD    (R0),AC0        ;TEST INSTRUCTION
 4493  020166  170205                          STFPS   R5              ;GET FPS
 4494  020170  170011                          SETD                    ;SET DOUBLE MODE
 4495  020172  012700  020364                  MOV     #WPAT00,R0
 4496  020176  174010                          STD     AC0,(R0)        ;GET THE RESULT
 4497  020200  012701  020364                  MOV     #WPAT00,R1
 4498  020204  012702  000004                  MOV     #4,R2
 4499  020210  022021                  W13:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
 4500  020212  001402                          BEQ     W14
 4501                                                                  ;NO.
 4502  020214  104002                  1$:     ERROR   2
 4503  020216  000472                          BR      WDONE
 4504  020220  077205                  W14:    SOB     R2,W13
 4505  020222  022705  000204                  CMP     #204,R5         ;IS FPS CORRECT?
 4506  020226  001407                          BEQ     W15
 4507                                                                  ;NO.
 4508  020230  012737  000204  001242          MOV     #204,@#$TMP4
 4509  020236  010537  001240                  MOV     R5,@#$TMP3
 4510  020242  104001                  1$:     ERROR   1
 4511  020244  000457                          BR      WDONE
 4512  020246                          W15:
 4513  020246  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4514  020250  012700  000200                  MOV     #200,R0
 4515  020254  170100                          LDFPS   R0              ;SET DOUBLE MODE
 4516  020256  012700  020364                  MOV     #WPAT00,R0      ;LOAD AC0=0
 4517  020262  172410                          LDD     (R0),AC0
 4518  020264  012737  020302  001236          MOV     #W16,@#$TMP2
```

```
4519  020272  005000                          CLR     R0
4520  020274  170100                          LDFPS   R0              ;ENTER FLOATING MODE.
4521  020276  012700  020364                  MOV     #WPAT00,R0
4522  020302  173010                  W16:    SUBF    (R0),AC0        ;TEST INSTRUCTION.
4523  020304  170205                          STFPS   R5              ;GET FPS
4524  020306  170011                          SETD                    ;RESET TO DOUBLE MODE
4525  020310  012700  020364                  MOV     #WPAT00,R0      ;GET THE RESULT.
4526  020314  174010                          STD     AC0,(R0)
4527  020316  012701  020364                  MOV     #WPAT00,R1
4528  020322  012702  000004                  MOV     #4,R2
4529  020326  022021                  W17:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
4530  020330  001402                          BEQ     W20
4531                                                                  ;NO.
4532  020332  104002                  1$:     ERROR   2
4533  020334  000423                          BR      WDONE
4534  020336  077205                  W20:    SOB     R2,W17
4535  020340  022705  000004                  CMP     #4,R5           ;IS FPS CORRECT?
4536  020344  001417                          BEQ     WDONE
4537                                                                  ;NO
4538  020346  012737  000004  001242          MOV     #4,@#$TMP4
4539  020354  010537  001240                  MOV     R5,@#$TMP3
4540  020360  104001                  1$:     ERROR   1
4541  020362  000410                          BR      WDONE
4542
4543  020364  000000                  WPAT00: .WORD   0
4544  020366  000000                  WPAT01:         0
4545  020370  000000                  WPAT02:         0
4546  020372  000000                  WPAT03:         0
4547
4548  020374  000000                  WDAP00: .WORD   0
4549  020376  000000                  WDAT01:         0
4550  020400  000000                  WDAT02:         0
4551  020402  000000                  WDAT03:         0
4552
4553  020404                          WDONE:
4554  020404  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
4555                                                                  ;SEE IF THE USER HAS EXPRESSED
4556                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
4557                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
4558                                                                  ;THE USER TYPED CONTROL G?).
4559
4560
4561                                  ;;*****************************************************************
4562                                  ;*TEST 26       ADDD AND SUB WITH FSRC=0
4563                                  ;*
4564                                  ;* THIS IS A TEST OF ADD AND SUB WITH FSRC=0.
4565                                  ;*
4566
4567                                  ;;*****************************************************************
4568  020406  000004                  TST26:  SCOPE
4569  020410                          X1:
4570  020410  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4571  020412  012700  000200                  MOV     #200,R0
4572  020416  170100                          LDFPS   R0              ;SET DOUBLE MODE
4573  020420  012700  021150                  MOV     #XPAT00,R0      ;SET AC0 TO POSITIVE
4574  020424  010037  021136                  MOV     R0,@#XTMP       ;NUMBER #0
```

```
 4575  020430  172410                          LDD     (R0),AC0
 4576  020432  012737  020444  001236          MOV     #X2,@#$TMP2
 4577  020440  012700  021160                  MOV     #XPAT10,R0      ;FSRC=0
 4578  020444  172010                  X2:     ADDD    (R0),AC0        ;TEST INSTRUCTION
 4579  020446  170205                          STFPS   R5
 4580  020450  170011                          SETD
 4581  020452  012700  021140                  MOV     #XDAT00,R0      ;GET RESULT.
 4582  020456  174010                          STD     AC0,(R0)
 4583  020460  012701  021150                  MOV     #XPAT00,R1
 4584  020464  012702  000004                  MOV     #4,R2
 4585  020470  022021                  X3:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
 4586  020472  001401                          BEQ     X4
 4587  020474  000553                          BR      XERR1
 4588  020476  077204                  X4:     SOB     R2,X3
 4589  020500  012704  000200                  MOV     #200,R4
 4590  020504  020405                          CMP     R4,R5           ;IS FPS CORRECT?
 4591  020506  001402                          BEQ     X5
 4592  020510  000137  021106                  JMP     @#XERR2
 4593  020514                          X5:
 4594  020514  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4595  020516  012700  000200                  MOV     #200,R0
 4596  020522  170100                          LDFPS   R0              ;SET DOUBLE MODE
 4597  020524  012700  021170                  MOV     #XPAT20,R0      ;SET AC0 TO
 4598  020530  010037  021136                  MOV     R0,@#XTMP       ;NEGATIVE NUMBER
 4599  020534  172410                          LDD     (R0),AC0
 4600  020536  012737  020550  001236          MOV     #X6,@#$TMP2
 4601  020544  012700  021160                  MOV     #XPAT10,R0      ;FSRC=0
 4602  020550  172010                  X6:     ADDD    (R0),AC0        ;TEST INSTRUCTION
 4603  020552  170205                          STFPS   R5
 4604  020554  170011                          SETD
 4605  020556  012700  021140                  MOV     #XDAT00,R0      ;GET RESULT
 4606  020562  174010                          STD     AC0,(R0)
 4607  020564  012701  021170                  MOV     #XPAT20,R1
 4608  020570  012702  000004                  MOV     #4,R2
 4609  020574  022021                  X7:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
 4610  020576  001401                          BEQ     X10
 4611  020600  000511                          BR      XERR1
 4612  020602  077204                  X10:    SOB     R2,X7
 4613  020604  012704  000210                  MOV     #210,R4
 4614  020610  020405                          CMP     R4,R5           ;IS FPS CORRECT?
 4615  020612  001401                          BEQ     X11
 4616  020614  000534                          BR      XERR2
 4617  020616                          X11:
 4618  020616  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4619  020620  012700  000200                  MOV     #200,R0
 4620  020624  170100                          LDFPS   R0              ;SET DOUBLE MODE
 4621  020626  012700  021150                  MOV     #XPAT00,R0      ;SET AC0 TO NON-ZERO
 4622  020632  010037  021136                  MOV     R0,@#XTMP       ;POSITIVE NUMBER
 4623  020636  172410                          LDD     (R0),AC0
 4624  020640  012737  020652  001236          MOV     #X12,@#$TMP2
 4625  020646  012700  021160                  MOV     #XPAT10,R0      ;FSRC=0
 4626  020652  173010                  X12:    SUBD    (R0),AC0        ;TEST INSTRUCTION
 4627  020654  170205                          STFPS   R5
 4628  020656  170011                          SETD
 4629  020660  012700  021140                  MOV     #XDAT00,R0      ;GET RESULT
 4630  020664  174010                          STD     AC0,(R0)
```

```
 4631  020666  012701  021150                    MOV     #XPAT00,R1
 4632  020672  012702  000004                    MOV     #4,R2
 4633  020676  022021                    X13:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
 4634  020700  001401                            BEQ     X14
 4635  020702  000463                            BR      XERR3
 4636  020704  077204                    X14:    SOB     R2,X13
 4637  020706  012704  000200                    MOV     #200,R4         ;IS FPS CORRECT?
 4638  020712  020405                            CMP     R4,R5
 4639  020714  001401                            BEQ     X15
 4640  020716  000501                            BR      XERR4
 4641  020720                            X15:
 4642  020720  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4643  020722  012700  000200                    MOV     #200,R0
 4644  020726  170100                            LDFPS   R0              ;SET DOUBLE MODE
 4645  020730  012700  021170                    MOV     #XPAT20,R0      ;SET AC0=A NEGATIVE
 4646  020734  010037  021136                    MOV     R0,@#XTMP       ;NUMBER
 4647  020740  172410                            LDD     (R0),AC0
 4648  020742  012737  020754  001236            MOV     #X16,@#$TMP2
 4649  020750  012700  021160                    MOV     #XPAT10,R0      ;FSRC=0
 4650  020754  173010                    X16:    SUBD    (R0),AC0        ;TEST INSTRUCTION.
 4651  020756  170205                            STFPS   R5
 4652  020760  170011                            SETD
 4653  020762  012700  021140                    MOV     #XDAT00,R0      ;GET RESULT
 4654  020766  174010                            STD     AC0,(R0)
 4655  020770  012701  021170                    MOV     #XPAT20,R1
 4656  020774  012702  000004                    MOV     #4,R2
 4657  021000  022021                    X17:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
 4658  021002  001401                            BEQ     X20
 4659  021004  000422                            BR      XERR3
 4660  021006  077204                    X20:    SOB     R2,X17
 4661  021010  012704  000210                    MOV     #210,R4         ;IS FPS CORRECT?
 4662  021014  020405                            CMP     R4,R5
 4663  021016  001401                            BEQ     X21
 4664  021020  000440                            BR      XERR4
 4665  021022  000466                    X21:    BR      XDONE
 4666
 4667                                    ;REPORT DATA ERRORS
 4668
 4669  021024  012737  021160  001240    XERR1:  MOV     #XPAT10,@#$TMP3
 4670  021032  013737  021136  001242            MOV     @#XTMP,@#$TMP4
 4671  021040  012737  021140  001244            MOV     #XDAT00,@#$TMP5
 4672  021046  104001                    1$:     ERROR   1
 4673  021050  000453                            BR      XDONE
 4674  021052  012737  021160  001240    XERR3:  MOV     #XPAT10,@#$TMP3
 4675  021060  013737  021136  001242            MOV     @#XTMP,@#$TMP4
 4676  021066  012737  021140  001244            MOV     #XDAT00,@#$TMP5
 4677  021074  013737  021136  001246            MOV     @#XTMP,@#$TMP6
 4678  021102  104002                    1$:     ERROR   2
 4679  021104  000435                            BR      XDONE
 4680
 4681                                    ;REPORT FPS ERRORS
 4682
 4683  021106                            XERR2:
 4684  021106  010537  001240                    MOV     R5,@#$TMP3
 4685  021112  010437  001242                    MOV     R4,@#$TMP4
 4686  021116  104001                    1$:     ERROR   1
```

```
 4687  021120  000427                          BR      XDONE
 4688  021122                          XERR4:
 4689  021122  010537  001240                  MOV     R5,@#$TMP3
 4690  021126  010437  001242                  MOV     R4,@#$TMP4
 4691  021132  104001                  1$:     ERROR   1
 4692  021134  000421                          BR      XDONE
 4693  021136  000000                  XTMP:   .WORD   0
 4694  021140  000000                  XDAT00: .WORD   0
 4695  021142  000000                  XDAT01:         0
 4696  021144  000000                  XDAT02:         0
 4697  021146  000000                  XDAT03:         0
 4698
 4699  021150  010421                  XPAT00: .WORD   010421
 4700  021152  021042                  XPAT01:         021042
 4701  021154  031463                  XPAT02:         031463
 4702  021156  042104                  XPAT03:         042104
 4703
 4704  021160  000000                  XPAT10: .WORD   0
 4705  021162  000000                  XAPT11:         0
 4706  021164  000000                  XPAT12:         0
 4707  021166  000000                  XPAT13:         0
 4708  021170  104210                  XPAT20: .WORD   104210
 4709  021172  114631                  XPAT21:         114631
 4710  021174  125252                  XPAT22:         125252
 4711  021176  135673                  XPAT23:         135673
 4712
 4713  021200                          XDONE:
 4714  021200  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 4715                                                                  ;SEE IF THE USER HAS EXPRESSED
 4716                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 4717                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 4718                                                                  ;THE USER TYPED CONTROL G?).
 4719
 4720                                  ;;*****************************************************************
 4721                                  ;*TEST 27       SUBD WITH AC=0 TEST
 4722                                  ;*
 4723                                  ;* THIS IS A TEST OF SUBD WITH AC=0.  BOTH POSITIVE
 4724                                  ;* AND NEGATIVE FSRC'S ARE TRIED.
 4725                                  ;*
 4726
 4727                                  ;;*****************************************************************
 4728  021202  000004                  TST27:  SCOPE
 4729  021204  005037  021534                  CLR     @#YFLAG
 4730  021210  012737  021554  021536          MOV     #YPAT00,@#YTMP1 ;P
 4731  021216  012737  021564  021540          MOV     #YPAT10,@#YTMP2 ;N
 4732  021224  012737  000210  021542          MOV     #210,@#YTMP3
 4733  021232                          Y1:
 4734  021232  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4735  021234  012700  000200                  MOV     #200,R0
 4736  021240  170100                          LDFPS   R0              ;SET DOUBLE MODE
 4737  021242  012700  021574                  MOV     #YPAT20,R0      ;SET AC0=0
 4738  021246  172410                          LDD     (R0),AC0
 4739  021250  013700  021536                  MOV     @#YTMP1,R0
 4740  021254  173010                  Y2:     SUBD    (R0),AC0        ;TEST INSTRUCTION
 4741  021256  170205                          STFPS   R5
 4742  021260  170011                          SETD
```

```
4743  021262  012700  021544              MOV     #YDAT00,R0      ;GET RESULT
4744  021266  174010                      STD     AC0,(R0)
4745  021270  012702  000004              MOV     #4,R2
4746  021274  013701  021540              MOV     @#YTMP2,R1      ;CHECK RESULT.
4747  021300  022021                Y3:   CMP     (R0)+,(R1)+
4748  021302  001026                      BNE     Y6
4749  021304  077203                      SOB     R2,Y3
4750  021306  023705  021542              CMP     @#YTMP3,R5      ;FPS CORRECT?
4751  021312  001401                      BEQ     Y4
4752  021314  000475                      BR      YERR3
4753  021316  005737  021534        Y4:   TST     @#YFLAG         ;FINISHED TEST?
4754  021322  001015                      BNE     Y5
4755  021324  012737  177777  021534      MOV     #-1,@#YFLAG
4756  021332  012737  021564  021536      MOV     #YPAT10,@#YTMP1
4757  021340  012737  021554  021540      MOV     #YPAT00,@#YTMP2
4758  021346  012737  000200  021542      MOV     #200,@#YTMP3
4759  021354  000726                      BR      Y1
4760  021356  000512                Y5:   BR      YDONE
4761  021360  012702  000004        Y6:   MOV     #4,R2
4762  021364  012700  021536              MOV     #YTMP1,R0       ;DID XOR OF SIGN BIT
4763  021370  012701  021544              MOV     #YDAT00,R1      ;FAIL?
4764  021374  022021                Y7:   CMP     (R0)+,(R1)+
4765  021376  001002                      BNE     YERR1
4766  021400  077203                      SOB     R2,Y7
4767  021402  000421                      BR      YERR2
4768  021404                        YERR1:                        ;DATA FAILURE
4769  021404  012737  021254  001236      MOV     #Y2,@#$TMP2
4770  021412  013737  021536  001240      MOV     @#YTMP1,@#$TMP3
4771  021420  012737  021574  001242      MOV     #YPAT20,@#$TMP4
4772  021426  012737  021544  001244      MOV     #YDAT00,@#$TMP5
4773  021434  013737  021540  001246      MOV     @#YTMP2,@#$TMP6
4774  021442  104001                1$:   ERROR   1
4775  021444  000457                      BR      YDONE
4776  021446                        YERR2:                        ;XOR OF SIGN BIT
4777  021446  012737  021254  001236      MOV     #Y2,@#$TMP2     ;FAILED
4778  021454  013737  021536  001240      MOV     @#YTMP1,@#$TMP3
4779  021462  012737  021574  001242      MOV     #YPAT20,@#$TMP4
4780  021470  012737  021544  001244      MOV     #YDAT00,@#$TMP5
4781  021476  013737  021540  001246      MOV     @#YTMP2,@#$TMP6
4782  021504  104002                1$:   ERROR   2
4783  021506  000436                      BR      YDONE
4784  021510                        YERR3:                        ;FPS WRONG.
4785  021510  012737  021254  001236      MOV     #Y2,@#$TMP2
4786  021516  010537  001240              MOV     R5,@#$TMP3
4787  021522  013737  021542  001242      MOV     @#YTMP3,@#$TMP4
4788  021530  104002                1$:   ERROR   2
4789  021532  000424                      BR      YDONE
4790
4791  021534  000000              YFLAG:  .WORD   0
4792  021536  000000              YTMP1:          0
4793  021540  000000              YTMP2:          0
4794  021542  000000              YTMP3:          0
4795
4796  021544  000000              YDAT00: .WORD   0
4797  021546  000000              YDAT01:         0
4798  021550  000000              YDAT02:         0
```

```
4799  021552  000000                  YDAT03:         0
4800
4801  021554  063146                  YPAT00:         063146
4802  021556  052525                  YPAT01:         052525
4803  021560  042104                  YPAT02:         042104
4804  021562  167356                  YPAT03:         167356
4805
4806  021564  163146                  YPAT10:         163146
4807  021566  052525                  YPAT11:         052525
4808  021570  042104                  YPAT12:         042104
4809  021572  167356                  YPAT13:         167356
4810
4811  021574  000000                  YPAT20:         0
4812  021576  000000                  YPAT21:         0
4813  021600  000000                  YPAT22:         0
4814  021602  000000                  YPAT23:         0
4815
4816  021604                          YDONE:
4817  021604  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
4818                                                                  ;SEE IF THE USER HAS EXPRESSED
4819                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
4820                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
4821                                                                  ;THE USER TYPED CONTROL G?).
4822                                  ;;**************************************************************
4823                                  ;*TEST 30       ADDD WITH AC=0 TEST
4824
4825                                  ;@
4826                                  ;@ THIS IS A TEST OF ADDD WITH AC=0.  BOTH
4827                                  ;* POSITIVE AND NEGATIVE FSRC'S ARE TRIED.
4828                                  ;*
4829
4830                                  ;;**************************************************************
4831  021606  000004                  TST30:  SCOPE
4832  021610  005067  000224                  CLR     ZFLAG
4833  021614  012737  022056  022042          MOV     #ZPAT00,@#ZTMP1 ;P
4834  021622  012737  000200  022044          MOV     #200,@#ZTMP2
4835  021630                          Z1:
4836  021630  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4837  021632  012700  000200                  MOV     #200,R0
4838  021636  170100                          LDFPS   R0              ;SET DOUBLE MODE
4839  021640  012700  022076                  MOV     #ZPAT20,R0      ;SET AC0=0
4840  021644  172410                          LDD     (R0),AC0
4841  021646  013700  022042                  MOV     @#ZTMP1,R0
4842  021652  172010                  Z2:     ADDD    (R0),AC0        ;TEST INSTRUCTION
4843  021654  170205                          STFPS   R5
4844  021656  170011                          SETD
4845  021660  012700  022046                  MOV     #ZDAT00,R0      ;GET RESULT
4846  021664  174010                          STD     AC0,(R0)
4847  021666  012702  000004                  MOV     #4,R2
4848  021672  013701  022042                  MOV     @#ZTMP1,R1      ;RESULT CORRECT?
4849  021676  022021                  Z3:     CMP     (R0)+,(R1)+
4850  021700  001401                          BEQ     Z4
4851  021702  000423                          BR      ZERR1
4852  021704  077204                  Z4:     SOB     R2,Z3
4853  021706  023705  022044                  CMP     @#ZTMP2,R5      ;FPS CORRECT?
4854  021712  001401                          BEQ     Z5
```

```
4855  021714  000437                          BR      ZERR2
4856  021716  005737  022040          Z5:     TST     @#ZFLAG         ;FINISHED TEST?
4857  021722  001012                          BNE     Z6
4858  021724  012737  177777  022040          MOV     #-1,@#ZFLAG
4859  021732  012737  022066  022042          MOV     #ZPAT10,@#ZTMP1
4860  021740  012737  000210  022044          MOV     #210,@#ZTMP2
4861  021746  000730                          BR      Z1
4862  021750  000456                  Z6:     BR      ZDONE
4863  021752                          ZERR1:                          ;DATA FAILURE
4864  021752  012737  021652  001236          MOV     #Z2,@#$TMP2
4865  021760  013737  022042  001240          MOV     @#ZTMP1,@#$TMP3
4866  021766  012737  022076  001242          MOV     #ZPAT20,@#$TMP4
4867  021774  012737  022046  001244          MOV     #ZDAT00,@#$TMP5
4868  022002  013737  022042  001246          MOV     @#ZTMP1,@#$TMP6
4869  022010  104002                  1$:     ERROR   2
4870  022012  000435                          BR      ZDONE
4871  022014                          ZERR2:
4872  022014  012737  021652  001236          MOV     #Z2,@#$TMP2
4873  022022  010537  001240                  MOV     R5,@#$TMP3
4874  022026  013737  022044  001242          MOV     @#ZTMP2,@#$TMP4
4875  022034  104002                  1$:     ERROR   2
4876  022036  000423                          BR      ZDONE
4877
4878  022040  000000                  ZFLAG:  .WORD   0
4879  022042  000000                  ZTMP1:          0
4880  022044  000000                  ZTMP2:          0
4881
4882  022046  000000                  ZDAT00: .WORD   0
4883  022050  000000                  ZDAT01:         0
4884  022052  000000                  ZDAT02:         0
4885  022054  000000                  ZDAT03:         0
4886
4887  022056  031463                  ZPAT00:         031463
4888  022060  010421                  ZPAT01:         010421
4889  022062  146314                  ZPAT02:         146314
4890  022064  156735                  ZPAT03:         156735
4891
4892  022066  156735                  ZPAT10:         156735
4893  022070  167356                  ZPAT11:         167356
4894  022072  135673                  ZPAT12:         135673
4895  022074  146314                  ZPAT13:         146314
4896
4897  022076  000000                  ZPAT20:         0
4898  022100  000000                  ZPAT21:         0
4899  022102  000000                  ZPAT22:         0
4900  022104  000000                  ZPAT23:         0
4901
4902  022106                          ZDONE:
4903  022106  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
4904                                                                  ;SEE IF THE USER HAS EXPRESSED
4905                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
4906                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
4907                                                                  ;THE USER TYPED CONTROL G?).
4908
4909
4910                                  ;;**************************************************************
```

```
                                ;*TEST 31       ADDF AND ADDD WITH E(AC)=E(FSRC) TEST AND (BUT FT) TEST
                                ;*
                                ;* THIS IS A TEST OF THE ADD INSTRUCTION WITH THE
                                ;* OPERANDS HAVING EQUAL EXPONENTS.
                                ;* THE ROUND/TRUNK FLOWS IS ALSO TESTED.
                                ;*
                                ;;*****************************************************************
022110  000004                  TST31:  SCOPE
022112                          AA1:
022112  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
022114  012700  003240                  MOV     #3240,R0
022120  170100                          LDFPS   R0              ;SET FIU FIV FD AND FT
022122  012737  022472  000244          MOV     #AAERR0,@#FPVECT  ;IN CASE THE OVER/UNDER
022130  012700  023050                  MOV     #AAPAT0,R0      ;FLOWS IN TRAP WILL
                                                                ;OCCUR
022134  172410                          LDD     (R0),AC0        ;SET UP AC0
022136  012737  022150  001236          MOV     #AA2,@#$TMP2    ;OPERAND
022144  012700  023060                  MOV     #AAPAT1,R0
022150  172010                  AA2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
                                                                ;SHOULD TRUNCATE
022152  012700  023040          AA3:    MOV     #AADAT0,R0
022156  174010                          STD     AC0,(R0)        ;GET THE RESULT
022160  012701  023070                  MOV     #AAPAT2,R1
022164  012702  000004                  MOV     #4,R2
022170  022021                  AA4:    CMP     (R0)+,(R1)+     ;CORRECT?
022172  001414                          BEQ     AA7
022174  012700  023100                  MOV     #AAPAT3,R0      ;DID (BUT FT) FAIL
022200  012701  023040                  MOV     #AADAT0,R1
022204  012702  000004                  MOV     #4,R2
022210  022021                  AA5:    CMP     (R0)+,(R1)+
022212  001401                          BEQ     AA6
022214  000561                          BR      AAERR1  ;DATA ERROR
022216  077204                  AA6:    SOB     R2,AA5
022220  000137  022614                  JMP     @#AAERR2        ;(BUT FT) ERROR
022224  077217                  AA7:    SOB     R2,AA4

                                ;NOW TEST DOUBLE FLOATING ROUND MODE.
                                ;A 1 SHOULD BE ADDED TO THE LSB ON ROUNG MODE.

022226                          AA10:
022226  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
022230  012700  003200                  MOV     #3200,R0        ;SET FD FIV FIV. FT=0
022234  170100                          LDFPS   R0
022236  012700  023050                  MOV     #AAPAT0,R0
022242  172410                          LDD     (R0),AC0        ;SET UP AC0 OPERAND
022244  012737  022256  001236          MOV     #AA11,@#$TMP2
022252  012700  023060                  MOV     #AAPAT1,R0
022256  172010                  AA11:   ADDD    (R0),AC0        ;TEST INSTRUCTION
                                                                ;SHOULD ROUND
022260  012700  023040          AA12:   MOV     #AADAT0,R0
022264  174010                          STD     AC0,(R0)        ;GET THE RESULT
022266  012701  023100                  MOV     #AAPAT3,R1
022272  012702  000004                  MOV     #4,R2
022276  022021                  AA13:   CMP     (R0)+,(R1)+     ;CORRECT?
022300  001425                          BEQ     AA20
022302  012700  023070                  MOV     #AAPAT2,R0      ;DID (BUT FT) FAIL?
```

```
 4967  022306  012701  023040                 MOV     #AADATO,R1
 4968  022312  012702  000004                 MOV     #4,R2
 4969  022316  022021                 AA14:   CMP     (R0)+,(R1)+
 4970  022320  001413                         BEQ     AA17
 4971  022322  012700  023110                 MOV     #AAPAT4,R0      ;WAS THE FLOATING
 4972  022326  012701  023040                 MOV     #AADATO,R1      ;CONSTANT USED
 4973  022332  012702  000004                 MOV     #4,R2           ;INSTEAD OF THE
 4974  022336  022021                 AA15:   CMP     (R0)+,(R1)+     ;DOUBLE CONSTANT
 4975  022340  001401                         BEQ     AA16            ;IN THE ROUND
 4976  022342  000542                         BR      AAERR3  ;FLOWS?
 4977  022344  077204                 AA16:   SOB     R2,AA15         ;DATA ERROR
 4978  022346  000544                         BR      AAERR4  ;CONSTANT ERROR
 4979  022350  077216                 AA17:   SOB     R2,AA14
 4980  022352  000560                         BR      AAERR5  ;(BUT FT) ERROR
 4981  022354  077230                 AA20:   SOB     R2,AA13
 4982
 4983                                 ;NOW TEST ADDF WITH FT=0, ROUND MODE
 4984
 4985  022356                         AA21:
 4986  022356  104414                         LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4987  022360  012700  003200                 MOV     #3200,R0                ;FIV=1, FIV=1, FT=0
 4988  022364  170100                         LDFPS   R0
 4989  022366  012700  023050                 MOV     #AAPAT0,R0      ;LOAD AC0 OPERAND
 4990  022372  172410                         LDD     (R0),AC0
 4991  022374  170001                         SETF                    ;ENTER FLOATING MODE
 4992  022376  012737  022410  001236         MOV     #AA22,@#$TMP2
 4993  022404  012700  023120                 MOV     #AAPAT5,R0
 4994  022410  172010                 AA22:   ADDF    (R0),AC0        ;TEST INSTRUCTION
 4995                                                                 ;SHOULD ROUND
 4996  022412                         AA23:
 4997  022412  170011                         SETD                    ;RESET TO DOUBLE
 4998                                                                 ;MODE
 4999  022414  012700  023040                 MOV     #AADATO,R0      ;GET THE RESULT
 5000  022420  174010                         STD     AC0,(R0)
 5001  022422  012701  023130                 MOV     #AAPAT6,R1      ;CORRECT?
 5002  022426  012702  000002                 MOV     #2,R2
 5003  022432  022021                 AA24:   CMP     (R0)+,(R1)+
 5004  022434  001413                         BEQ     AA27
 5005  022436  012700  023070                 MOV     #AAPAT2,R0      ;WAS THE DOUBLE
 5006  022442  012701  023040                 MOV     #AADATO,R1      ;CONSTANT USED INSTEAD
 5007  022446  012702  000002                 MOV     #2,R2           ;OF THE FLOATING
 5008  022452  022011                 AA25:   CMP     (R0)+,(R1)      ;CONSTANT IN THE
 5009  022454  001401                         BEQ     AA26            ;ROUND FLOWS?
 5010  022456  000534                         BR      AAERR6  ;DATA ERROR
 5011  022460  077204                 AA26:   SOB     R2,AA25
 5012  022462  000550                         BR      AAERR7  ;CONSTANT ERROR
 5013  022464  077216                 AA27:   SOB     R2,AA24
 5014  022466  000137  023140                 JMP     @#AADONE
 5015
 5016                                 ;COME HERE IF A TRAP OCCURS TO 244.
 5017
 5018  022472  013700  001236         AAERR0: MOV     @#$TMP2,R0      ;SEE IF THE TRAP WAS
 5019  022476  005720                         TST     (R0)+   ;AT A TEST INSTRUCTION
 5020  022500  020016                         CMP     R0,(SP)
 5021  022502  001402                         BEQ     1$
 5022  022504  000137  062534         10$:    JMP     @#FPSPUR
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5023  022510                                  1$:
5024  022510  170300                                  STST    R0              ;GET FEC
5025  022512  020027  000010                          CMP     R0,#10
5026  022516  001405                                  BEQ     20$             ;OVERFLOW
5027  022520  020027  000012                          CMP     R0,#12
5028  022524  001410                                  BEQ     30$             ;UNDERFLOW
5029  022526  000766                                  BR      10$
5030  022530  022532                          20$
5031  022532  011637  001236                20$:     MOV     (SP),@#$TMP2    ;REPORT OVERFLOW ERROR
5032  022536  022626                                  CMP     (SP)+,(SP)+
5033  022540  104002                          21$:     ERROR   2
5034  022542  000137  023140                25$:     JMP     @#AADONE
5035  022546  011637  001236                30$:     MOV     (SP),@#$TMP2    ;REPORT UNDERFLOW
5036  022552  022626                                  CMP     (SP)+,(SP)+     ;ERROR
5037  022554  104002                          31$:     ERROR   2
5038  022556  000771                                  BR      25$
5039
5040                                          ;ADDD RESULT INCORRECT
5041  022560  012737  023070  001246          AAERR1: MOV     #AAPAT2,@#$TMP6
5042  022566  012737  023050  001242          AAER10: MOV     #AAPAT0,@#$TMP4
5043  022574  012737  023060  001240                  MOV     #AAPAT1,@#$TMP3
5044  022602  012737  023040  001244                  MOV     #AADAT0,@#$TMP5
5045  022610  104002                          1$:     ERROR   2
5046  022612  000552                                  BR      AADONE
5047  022614  012737  023070  001246          AAERR2: MOV     #AAPAT2,@#$TMP6 ;(BUT FT) FAILED.
5048  022622  012737  023050  001242                  MOV     #AAPAT0,@#$TMP4
5049  022630  012737  023060  001240                  MOV     #AAPAT1,@#$TMP3
5050  022636  012737  023040  001244                  MOV     #AADAT0,@#$TMP5
5051  022644  104002                          1$:     ERROR   2
5052  022646  000534                                  BR      AADONE
5053  022650  012737  023100  001246          AAERR3: MOV     #AAPAT3,@#$TMP6 ;DATA ERROR.
5054  022656  000743                                  BR      AAER10
5055  022660  012737  023100  001246          AAERR4: MOV     #AAPAT3,@#$TMP6 ;BAD CONSTANT
5056  022666  012737  023050  001242                  MOV     #AAPAT0,@#$TMP4
5057  022674  012737  023060  001240                  MOV     #AAPAT1,@#$TMP3
5058  022702  012737  023040  001244                  MOV     #AADAT0,@#$TMP5
5059  022710  104002                          1$:     ERROR   2
5060  022712  000512                                  BR      AADONE
5061  022714  012737  023100  001246          AAERR5: MOV     #AAPAT3,@#$TMP6 ;(BUT FT) FAILED.
5062  022722  012737  023050  001242                  MOV     #AAPAT0,@#$TMP4
5063  022730  012737  023060  001240                  MOV     #AAPAT1,@#$TMP3
5064  022736  012737  023040  001244                  MOV     #AADAT0,@#$TMP5
5065  022744  104002                          1$:     ERROR   2
5066  022746  000474                                  BR      AADONE
5067  022750  012737  023120  001240          AAERR6: MOV     #AAPAT5,@#$TMP3 ;FD=0 AND
5068  022756  012737  023050  001242                  MOV     #AAPAT0,@#$TMP4 ;DATA ERROR
5069  022764  012737  023040  001244                  MOV     #AADAT0,@#$TMP5
5070  022772  012737  023130  001246                  MOV     #AAPAT6,@#$TMP6
5071  023000  104002                          1$:     ERROR   2
5072  023002  000456                                  BR      AADONE
5073  023004  012737  023120  001240          AAERR7: MOV     #AAPAT5,@#$TMP3 ;CONSTANT ERROR
5074  023012  012737  023050  001242                  MOV     #AAPAT0,@#$TMP4
5075  023020  012737  023040  001244                  MOV     #AADAT0,@#$TMP5
5076  023026  012737  023130  001246                  MOV     #AAPAT6,@#$TMP6
5077  023034  104002                          1$:     ERROR   2
5078  023036  000440                                  BR      AADONE
```

```
 5079  023040  000000                    AADAT0:         0
 5080  023042  000000                                    0
 5081  023044  000000                                    0
 5082  023046  000000                                    0
 5083  023050  000200                    AAPAT0:         200
 5084  023052  000000                                    0
 5085  023054  000000                                    0
 5086  023056  000000                                    0
 5087  023060  000200                    AAPAT1:         200
 5088  023062  000000                                    0
 5089  023064  000000                                    0
 5090  023066  000001                                    1
 5091  023070  000400                    AAPAT2:         400
 5092  023072  000000                                    0
 5093  023074  000000                                    0
 5094  023076  000000                                    0
 5095  023100  000400                    AAPAT3:         400
 5096  023102  000000                                    0
 5097  023104  000000                                    0
 5098  023106  000001                                    1
 5099  023110  000400                    AAPAT4:         400
 5100  023112  000000                                    0
 5101  023114  100000                                    100000
 5102  023116  000000                                    0
 5103  023120  000200                    AAPAT5:         200
 5104  023122  000001                                    1
 5105  023124  000000                                    0
 5106  023126  000000                                    0
 5107  023130  000400                    AAPAT6:         400
 5108  023132  000001                                    1
 5109  023134  000000                                    0
 5110  023136  000000                                    0
 5111  023140                            AADONE:
 5112  023140  104413                            RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 5113                                                                    ;SEE IF THE USER HAS EXPRESSED
 5114                                                                    ;THE DESIRE TO CHANGE THE SOFTWARE
 5115                                                                    ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 5116                                                                    ;THE USER TYPED CONTROL G?).
 5117                                    ;;**************************************************************
 5118                                    ;*TEST 32       ADDF AND ADDD WITH E(AC) LESS THAN E(FSRC) TEST
 5119                                    ;*
 5120                                    ;*THIS IS ATEST OF THE ADDD AND ADDF
 5121                                    ;*INSTRUCTIONS AND THE ALIGN AC ALGORITHM
 5122                                    ;*FLOWS.  THE CONSTANT (25 FOR FLOATING, 57 FOR
 5123                                    ;*DOUBLE) USED IS CHECKED.  THEN SIMPLE
 5124                                    ;*AND WORST CASE ALIGNMENT SITUATIONS ARE
 5125                                    ;*TRIED.  NOTE E(AC) IS LESS THEN E(FSRC)
 5126                                    ;*
 5127                                    ;;**************************************************************
 5128  023142  000004                    TST32:  SCOPE
 5129                                    ;EXPONENT DIFFERENCE=57=71 (OCT) FD=1
 5130  023144                            CC1:
 5131  023144  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5132  023146  012704  003200                    MOV     #3200,R4        ;SET FIV,FIV, AND FD
 5133  023152  170104                            LDFPS   R4
 5134  023154  012737  023174  001236            MOV     #CC2,@#$TMP2
```

```
5135  023162  012700  024576                MOV     #CCP0,R0        ;SET AC0 OPERAND
5136  023166  172410                       LDD     (R0),AC0                ;AC0
5137  023170  012700  024616                MOV     #CCP2,R0
5138  023174  172010                CC2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
5139  023176  170205                        STFPS   R5              ;GET FPS
5140  023200  012700  024566                MOV     #CCDAT0,R0      ;GET THE RESULT
5141  023204  174010                        STD     AC0,(R0)
5142  023206  012701  024616                MOV     #CCP2,R1        ;IS IT CORRECT
5143  023212  012702  000004                MOV     #4,R2
5144  023216  022021                CC3:    CMP     (R0)+,(R1)+
5145  023220  001415                        BEQ     CC6
5146  023222  012700  024566                MOV     #CCDAT0,R0      ;DID A BAD
5147  023226  012701  024576                MOV     #CCP0,R1        ;CONSTANT (NOT 57)
5148  023232  012702  000004                MOV     #4,R2           ;GET GENERATED
5149  023236  022021                CC4:    CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5150  023240  001402                        BEQ     CC5             ;FLOWS?
5151  023242  000137  024164                JMP     @#CCER1         ;DATA ERROR.D
5152  023246  077205                CC5:    SOB     R2,CC4
5153  023250  000137  024222                JMP     @#CCER2         ;BAD CONSTANT.D
5154  023254  077220                CC6:    SOB     R2,CC3
5155  023256  020405                        CMP     R4,R5           ;FPS CORRECT?
5156  023260  001402                        BEQ     CC7
5157  023262  000137  024130                JMP     @#CCER0         ;BAD FPS.
5158                                ;EXPONENT DIFFERENCE=56=70 (OCT) FD=1
5159  023266                        CC7:
5160  023266  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5161  023270  012704  003200                MOV     #3200,R4        ;SET FIV,FIV, AND FD
5162  023274  170104                        LDFPS   R4
5163  023276  012737  023316  001236        MOV     #CC8,@#$TMP2
5164  023304  012700  024576                MOV     #CCP0,R0        ;SET AC0 OPERAND
5165  023310  172410                        LDD     (R0),AC0
5166  023312  012700  024606                MOV     #CCP1,R0        ;FSRC
5167  023316  172010                CC8:    ADDD    (R0),AC0        ;TEST INSTRUCTION
5168  023320  170205                        STFPS   R5              ;GET FPS
5169  023322  012700  024566                MOV     #CCDAT0,R0      ;GET THE RESULT
5170  023326  174010                        STD     AC0,(R0)
5171  023330  012701  024666                MOV     #CCP7,R1        ;IS IT CORRECT
5172  023334  012702  000004                MOV     #4,R2
5173  023340  022021                CC9:    CMP     (R0)+,(R1)+
5174  023342  001415                        BEQ     CC12
5175  023344  012700  024566                MOV     #CCDAT0,R0      ;DID A BAD
5176  023350  012701  024606                MOV     #CCP1,R1        ;CONSTANT (NOT 57)
5177  023354  012702  000004                MOV     #4,R2           ;GET GENERATED
5178  023360  022021                CC10:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5179  023362  001402                        BEQ     CC11            ;FLOWS?
5180  023364  000137  024260                JMP     @#CCER3         ;DATA ERROR.D
5181  023370  077205                CC11:   SOB     R2,CC10
5182  023372  000137  024276                JMP     @#CCER4         ;BAD CONSTANT.D
5183  023376  077220                CC12:   SOB     R2,CC9
5184  023400  020405                        CMP     R4,R5           ;FPS CORRECT?
5185  023402  001402                        BEQ     CC13
5186  023404  000137  024130                JMP     @#CCER0         ;BAD FPS.
5187                                ;EXPONENT DIFFERENCE=25=31 (OCT) FD=0
5188  023410                        CC13:
5189  023410  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5190  023412  012737  023440  001236        MOV     #CC14,@#$TMP2
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5191  023420  012700  024576          MOV     #CCP0,R0        ;SET UP AC0 OPERAND.
5192  023424  172410                  LDD     (R0),AC0
5193  023426  012704  003000          MOV     #3000,R4        ;SET FIV,FIV. CLEAR FD.
5194  023432  170104                  LDFPS   R4
5195  023434  012700  024656          MOV     #CCP6,R0        ;FSRC
5196  023440  172010          CC14:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5197  023442  170205                  STFPS   R5
5198  023444  170011                  SETD                    ;REENTER DOUBLE MOVE
5199  023446  012700  024566          MOV     #CCDAT0,R0      ;GET THE RESULT
5200  023452  174010                  STD     AC0,(R0)
5201  023454  012701  024656          MOV     #CCP6,R1        ;IS THE RESULT CORRECT?
5202  023460  012702  000002          MOV     #2,R2
5203  023464  022021          CC15:   CMP     (R0)+,(R1)+
5204  023466  001415                  BEQ     CC18
5205  023470  012700  024566          MOV     #CCDAT0,R0      ;WAS A BAD CONSTANT
5206  023474  012701  024626          MOV     #CCP3,R1        ;USED (NOT 25) IN
5207  023500  012702  000002          MOV     #2,R2           ;THE ALIGN FLOWS?
5208  023504  022021          CC16:   CMP     (R0)+,(R1)+
5209  023506  001402                  BEQ     CC17
5210  023510  000137  024334          JMP     @#CCER5         ;DATA ERROR F
5211  023514  077205          CC17:   SOB     R2,CC16
5212  023516  000137  024370          JMP     @#CCER6         ;BAD CONSTANT F
5213  023522  077220          CC18:   SOB     R2,CC15
5214  023524  020405                  CMP     R4,R5
5215  023526  001402                  BEQ     CC19
5216  023530  000137  024146          JMP     @#CCER90        ;BAD FPS.
5217                          ;EXPONENT DIFFERENCE=24=30 (OCT) FD=0
5218  023534                  CC19:
5219  023534  104414                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5220  023536  012737  023564  001236  MOV     #CC20,@#$TMP2
5221  023544  012700  024626          MOV     #CCP3,R0        ;SET UP AC0 OPERAND.
5222  023550  172410                  LDD     (R0),AC0
5223  023552  012704  003000          MOV     #3000,R4        ;SET FIV,FIV. CLEAR FD.
5224  023556  170104                  LDFPS   R4
5225  023560  012700  024646          MOV     #CCP5,R0        ;FSRC
5226  023564  172010          CC20:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5227  023566  170205                  STFPS   R5
5228  023570  170011                  SETD                    ;REENTER DOUBLE MOVE
5229  023572  012700  024566          MOV     #CCDAT0,R0      ;GET THE RESULT
5230  023576  174010                  STD     AC0,(R0)
5231  023600  012701  024676          MOV     #CCP10,R1       ;IS THE RESLT CORRECT?
5232  023604  012702  000002          MOV     #2,R2
5233  023610  022021          CC21:   CMP     (R0)+,(R1)+
5234  023612  001415                  BEQ     CC24
5235  023614  012700  024566          MOV     #CCDAT0,R0      ;WAS A BAD CONSTANT
5236  023620  012701  024646          MOV     #CCP5,R1        ;USED (NOT 25) IN
5237  023624  012702  000002          MOV     #2,R2           ;THE ALIGN FLOWS?
5238  023630  022021          CC22:   CMP     (R0)+,(R1)+
5239  023632  001402                  BEQ     CC23
5240  023634  000137  024424          JMP     @#CCER7         ;DATA ERROR F
5241  023640  077205          CC23:   SOB     R2,CC22
5242  023642  000137  024442          JMP     @#CCER8 ;BAD CONSTANT F
5243  023646  077220          CC24:   SOB     R2,CC21
5244  023650  020405                  CMP     R4,R5
5245  023652  001402                  BEQ     CC25
5246  023654  000137  024146          JMP     @#CCER90        ;BAD FPS.
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5247
5248  023660
5249  023660  104414                    ;EXPONENT DIFFERENCE=1 FD=1
5250  023662  012704  003200            CC25:
5251  023666  170104                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5252  023670  012737  023710  001236            MOV     #3200,R4        ;SET FIV,FIV, AND FD
5253  023676  012700  024576                    LDFPS   R4
5254  023702  172410                            MOV     #CC26,@#$TMP2
5255  023704  012700  024626                    MOV     #CCP0,R0        ;SET AC0 OPERAND
5256  023710  172010                            LDD     (R0),AC0
5257  023712  170205                            MOV     #CCP3,R0        ;FSRC
5258  023714  012700  024566            CC26:   ADDD    (R0),AC0        ;TEST INSTRUCTION
5259  023720  174010                            STFPS   R5              ;GET FPS
5260  023722  012701  024706                    MOV     #CCDAT0,R0      ;GET THE RESULT
5261  023726  012702  000004                    STD     AC0,(R0)
5262  023732  022021                            MOV     #CCP11,R1       ;IS IT CORRECT
5263  023734  001415                            MOV     #4,R2
5264  023736  012700  024566            CC27:   CMP     (R0)+,(R1)+
5265  023742  012701  024626                    BEQ     CC30
5266  023746  012702  000004                    MOV     #CCDAT0,R0      ;DID A BAD
5267  023752  022021                            MOV     #CCP3,R1        ;CONSTANT (NOT 57)
5268  023754  001402                            MOV     #4,R2           ;GET GENERATED
5269  023756  000137  024476            CC28:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5270  023762  077205                            BEQ     CC29            ;FLOWS?
5271  023764  000137  024514                    JMP     @#CCER10        ;DATA ERROR.D
5272  023770  077220            CC29:   SOB     R2,CC28
5273  023772  020405                            JMP     @#CCER11        ;BAD CONSTANT.D
5274  023774  001402            CC30:   SOB     R2,CC27
5275  023776  000137  024130                    CMP     R4,R5           ;FPS CORRECT?
5276                                            BEQ     CC31
5277  024002                                    JMP     @#CCER0         ;BAD FPS.
5278  024002  104414            ;EXPONENT DIFFERENCE=100=144 (OCT) FD=1
5279  024004  012704  003200            CC31:
5280  024010  170104                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5281  024012  012737  024032  001236            MOV     #3200,R4        ;SET FIV,FIV, AND FD
5282  024020  012700  024576                    LDFPS   R4
5283  024024  172410                            MOV     #CC32,@#$TMP2
5284  024026  012700  024636                    MOV     #CCP0,R0        ;SET AC0 OPERAND
5285  024032  172010                            LDD     (R0),AC0
5286  024034  170205                            MOV     #CCP4,R0        ;FSRC
5287  024036  012700  024566            CC32:   ADDD    (R0),AC0        ;TEST INSTRUCTION
5288  024042  174010                            STFPS   R5              ;GET FPS
5289  024044  012701  024636                    MOV     #CCDAT0,R0      ;GET THE RESULT
5290  024050  012702  000004                    STD     AC0,(R0)
5291  024054  022021                            MOV     #CCP4,R1        ;IS IT CORRECT
5292  024056  001415                            MOV     #4,R2
5293  024060  012700  024566            CC33:   CMP     (R0)+,(R1)+
5294  024064  012701  024636                    BEQ     CC36
5295  024070  012702  000004                    MOV     #CCDAT0,R0      ;DID A BAD
5296  024074  022021                            MOV     #CCP4,R1        ;CONSTANT (NOT 57)
5297  024076  001402                            MOV     #4,R2           ;GET GENERATED
5298  024100  000137  024532            CC34:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5299  024104  077205                            BEQ     CC35            ;FLOWS?
5300  024106  000137  024550                    JMP     @#CCER12        ;DATA ERROR.D
5301  024112  077220            CC35:   SOB     R2,CC34
5302  024114  020405                            JMP     @#CCER13        ;BAD CONSTANT.D
                                    CC36:   SOB     R2,CC33
                                            CMP     R4,R5           ;FPS CORRECT?
```

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5303  024116  001402                        BEQ     CC37
5304  024120  000137  024130                JMP     @#CCER0         ;BAD FPS.
5305  024124  000137  024726        CC37:   JMP     @#CCDONE
5306  024130  010437  001242        CCER0:  MOV     R4,@#$TMP4      ;FPS ERROR D
5307  024134  010537  001240                MOV     R5,@#$TMP3
5308  024140  104002                1$:     ERROR   2
5309  024142  000137  024726                JMP     @#CCDONE
5310  024146  010437  001242        CCER90: MOV     R4,@#$TMP4      ;FPS ERROR F
5311  024152  010537  001240                MOV     R5,@#$TMP3
5312  024156  104002                1$:     ERROR   2
5313  024160  000137  024726                JMP     @#CCDONE
5314  024164  012737  024616  001240  CCER1:  MOV     #CCP2,@#$TMP3   ;DATA ERROR D
5315  024172  012737  024616  001246          MOV     #CCP2,@#$TMP6
5316  024200  012737  024576  001242  CCER50: MOV     #CCP0,@#$TMP4
5317  024206  012737  024566  001244          MOV     #CCDATO,@#$TMP5
5318  024214  104002                1$:     ERROR   2
5319  024216  000137  024726                JMP     @#CCDONE
5320  024222  012737  024616  001240  CCER2:  MOV     #CCP2,@#$TMP3   ;CONSTANT BAD D(B)
5321  024230  012737  024616  001246          MOV     #CCP2,@#$TMP6
5322  024236  012737  024576  001242  CCER22: MOV     #CCP0,@#$TMP4
5323  024244  012737  024566  001244          MOV     #CCDATO,@#$TMP5
5324  024252  104002                1$:     ERROR   2
5325  024254  000137  024726                JMP     @#CCDONE
5326  024260  012737  024606  001240  CCER3:  MOV     #CCP1,@#$TMP3
5327  024266  012737  024666  001246          MOV     #CCP7,@#$TMP6
5328  024274  000741                        BR      CCER50
5329  024276  012737  024606  001240  CCER4:  MOV     #CCP1,@#$TMP3   ;CONSTANT BAD D(G)
5330  024304  012737  024666  001246          MOV     #CCP7,@#$TMP6
5331  024312  012737  024576  001242  CCER44: MOV     #CCP0,@#$TMP4
5332  024320  012737  024566  001244          MOV     #CCDATO,@#$TMP5
5333  024326  104002                1$:     ERROR   2
5334  024330  000137  024726                JMP     @#CCDONE
5335  024334  012737  024656  001240  CCER5:  MOV     #CCP6,@#$TMP3   ;DATA ERROR F
5336  024342  012737  024656  001246          MOV     #CCP6,@#$TMP6
5337  024350  012737  024576  001242  CCER55: MOV     #CCP0,@#$TMP4
5338  024356  012737  024566  001244          MOV     #CCDATO,@#$TMP5
5339  024364  104002                1$:     ERROR   2
5340  024366  000557                        BR      CCDONE
5341  024370  012737  024656  001240  CCER6:  MOV     #CCP6,@#$TMP3   ;CONSTANT BAD F(B)
5342  024376  012737  024656  001246          MOV     #CCP6,@#$TMP6
5343  024404  012737  024576  001242          MOV     #CCP0,@#$TMP4
5344  024412  012737  024566  001244          MOV     #CCDATO,@#$TMP5
5345  024420  104002                1$:     ERROR   2
5346  024422  000541                        BR      CCDONE
5347  024424  012737  024646  001240  CCER7:  MOV     #CCP5,@#$TMP3   ;DATA ERROR F
5348  024432  012737  024676  001246          MOV     #CCP10,@#$TMP6
5349  024440  000743                        BR      CCER55
5350  024442  012737  024646  001240  CCER8:  MOV     #CCP5,@#$TMP3   ;CONSTANT BAD F(G)
5351  024450  012737  024676  001246          MOV     #CCP10,@#$TMP6
5352  024456  012737  024566  001244          MOV     #CCDATO,@#$TMP5
5353  024464  012737  024576  001242          MOV     #CCP0,@#$TMP4
5354  024472  104002                1$:     ERROR   2
5355  024474  000514                        BR      CCDONE
5356  024476  012737  024626  001240  CCER10: MOV     #CCP3,@#$TMP3   ;DATA ERROR D
5357  024504  012737  024706  001246          MOV     #CCP11,@#$TMP6
5358  024512  000632                        BR      CCER50
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5359  024514  012737  024626  001240  CCER11: MOV     #CCP3,@#$TMP3   ;CONSTANT BAD D(G)
5360  024522  012737  024706  001246          MOV     #CCP11,@#$TMP6
5361  024530  000670                  BR      CCER44
5362  024532  012737  024636  001240  CCER12: MOV     #CCP4,@#$TMP3   ;DATA ERROR D
5363  024540  012737  024636  001246          MOV     #CCP4,@#$TMP6
5364  024546  000614                  BR      CCER50
5365  024550  012737  024636  001240  CCER13: MOV     #CCP4,@#$TMP3   ;CONSTANT BAD D(B)
5366  024556  012737  024636  001246          MOV     #CCP4,@#$TMP6
5367  024564  000624                  BR      CCER22
5368  024566  000000          CCDATO: 0
5369  024570  000000                  0
5370  024572  000000                  0
5371  024574  000000                  0
5372  024576  000200          CCP0:   200                     ;E(AC)=1
5373  024600  000000                  0
5374  024602  000000                  0
5375  024604  000000                  0
5376  024606  016200          CCP1:   16200                   ;E(FSRC)=E(AC)+56=57
5377  024610  000000                  0                       ;       =71(OCT)
5378  024612  000000                  0
5379  024614  000000                  0
5380  024616  016400          CCP2:   16400                   ;E(FSRC)=E(AC)+57=58
5381  024620  000000                  0                       ;       =72(OCT)
5382  024622  000000                  0
5383  024624  000000                  0
5384  024626  000400          CCP3:   400                     ;E(FSRC)=E(AC)+1=2
5385  024630  000000                  0
5386  024632  000000                  0
5387  024634  000000                  0
5388  024636  031200          CCP4:   31200                   ;E(FSRC)=E(AC)+100=101=145(OCT)
5389  024640  000000                  0
5390  024642  000000                  0
5391  024644  000000                  0
5392  024646  006200          CCP5:   6200                    ;E(FSRC)=E(AC)+24=25=31(OCT)
5393  024650  000000                  0
5394  024652  000000                  0
5395  024654  000000                  0
5396  024656  006400          CCP6:   6400                    ;E(FSRC)=E(AC)+25=26=32(OCT)
5397  024660  000000                  0
5398  024662  000000                  0
5399  024664  000000                  0
5400  024666  016200          CCP7:   16200                   ;CCP1 RES
5401  024670  000000                  0
5402  024672  000000                  0
5403  024674  000001                  1
5404  024676  006200          CCP10:  6200                    ;CCP5 RES
5405  024700  000001                  1
5406  024702  000000                  0
5407  024704  000000                  0
5408  024706  000500          CCP11:  500                     ;CCP3 RES
5409  024710  000000                  0
5410  024712  000000                  0
5411  024714  000000                  0
5412  024716  000200          CCP12:  200                     ;BAD CONSTANT
5413  024720  000000                  0                       ;RES CCP2,CCP4
5414  024722  000000                  0
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 5415  024724  000000                          0
 5416
 5417  024726                          CCDONE:
 5418  024726  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 5419                                                                  ;SEE IF THE USER HAS EXPRESSED
 5420                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 5421                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 5422                                                                  ;THE USER TYPED CONTROL G?).
 5423
 5424                                  ;;*****************************************************************
 5425                                  ;*TEST 33       ADDF AND ADDD WITH E(AC) GREATER THAN E(FSRC) TEST
 5426                                  ;*
 5427                                  ;*THIS IS A TEST OF THE ADDD AND ADDF
 5428                                  ;*INSTRUCTIONS AND THE ALIGN FSRC ALGORITHM
 5429                                  ;*FLOWS.  FIRST THE CONSTANT USED IS CHECKED.
 5430                                  ;*THEN SIMPLE AND WORST CASE ALIGNMENT
 5431                                  ;*SITUATIONS ARE TRIED.  NOTE E(AC)
 5432                                  ;*IS GREATER THAN E(FSRC).
 5433                                  ;*
 5434                                  ;;*****************************************************************
 5435  024730  000004                  TST33:  SCOPE
 5436                                  ;EXPONENT DIFFERENCE=57=71 (OCT) FD=1
 5437  024732                          BB1:
 5438  024732  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5439  024734  012704  003200                  MOV     #3200,R4        ;SET FIV FIV, AND FD
 5440  024740  170104                          LDFPS   R4
 5441  024742  012737  025570  000244          MOV     #BBER0,@#FPVECT ;SET UP FOR ERROR
 5442  024750  012737  024770  001236          MOV     #BB2,@#$TMP2    ;IN CASE THE OVER\
 5443                                                                  ;UNDER FLOWS FAIL.
 5444  024756  012700  026132                  MOV     #BBPAT2,R0      ;SET AC0 OPERAND.
 5445  024762  172410                          LDD     (R0),AC0
 5446  024764  012700  026122                  MOV     #BBPAT1,R0      ;FSRC
 5447  024770  172010                  BB2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
 5448  024772  170205                          STFPS   R5
 5449  024774  012700  026102          BB3:    MOV     #BBDAT0,R0      ;GET THE RESULT
 5450  025000  174010                          STD     AC0,(R0)
 5451  025002  012701  026132                  MOV     #BBPAT2,R1      ;RESULT CORRECT?
 5452  025006  012702  000004                  MOV     #4,R2
 5453  025012  022021                  BB4:    CMP     (R0)+,(R1)+
 5454  025014  001402                          BEQ     BB5
 5455  025016  000137  025630                  JMP     @#BBER1         ;DATA ERROR D
 5456  025022  077205                  BB5:    SOB     R2,BB4
 5457                                                                  ;WAS FPS CORRECT?
 5458  025024  020405                          CMP     R4,R5
 5459  025026  001402                          BEQ     BB6
 5460  025030  000137  025570                  JMP     @#BBER0         ;FPS ERROR
 5461                                  ;EXPONENT DIFFERENCE=56=70 (OCT) FD=1
 5462  025034                          BB6:
 5463  025034  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5464  025036  012704  003200                  MOV     #3200,R4        ;SET FIV,FIV, AND FD
 5465  025042  170104                          LDFPS   R4
 5466  025044  012737  025064  001236          MOV     #BB7,@#$TMP2
 5467  025052  012700  026152                  MOV     #BBPAT4,R0      ;SET AC0 OPERAND
 5468  025056  172410                          LDD     (R0),AC0
 5469  025060  012700  026122                  MOV     #BBPAT1,R0      ;FSRC
 5470  025064  172010                  BB7:    ADDD    (R0),AC0        ;TEST INSTRUCTION
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5471  025066  170205                          STFPS   R5              ;GET FPS
5472  025070  012700  026102                  MOV     #BBDAT0,R0      ;GET THE RESULT
5473  025074  174010                          STD     AC0,(R0)
5474  025076  012701  026212                  MOV     #BBP10,R1       ;IS IT CORRECT
5475  025102  012702  000004                  MOV     #4,R2
5476  025106  022021                  BB10:   CMP     (R0)+,(R1)+
5477  025110  001415                          BEQ     BB13
5478  025112  012700  026102                  MOV     #BBDAT0,R0      ;DID A BAD
5479  025116  012701  026152                  MOV     #BBPAT4,R1      ;CONSTANT (NOT 57)
5480  025122  012702  000004                  MOV     #4,R2           ;GET GENERATED
5481  025126  022021                  BB11:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5482  025130  001402                          BEQ     BB12            ;FLOWS?
5483  025132  000137  025666                  JMP     @#BBER2         ;DATA ERROR.D
5484  025136  077205                  BB12:   SOB     R2,BB11
5485  025140  000137  025704                  JMP     @#BBER3         ;BAD CONSTANT.D
5486  025144  077220                  BB13:   SOB     R2,BB10
5487  025146  020405                          CMP     R4,R5           ;FPS CORRECT?
5488  025150  001402                          BEQ     BB14
5489  025152  000137  025570                  JMP     @#BBER0         ;BAD FPS.
5490                                  ;EXPONENT DIFFERENCE=25=31 (OCT) FD=0
5491  025156                          BB14:
5492  025156  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5493  025160  012737  025206  001236          MOV     #BB15,@#$TMP2
5494  025166  012700  026112                  MOV     #BBPAT0,R0      ;SET UP AC0 OPERAND
5495  025172  172410                          LDD     (R0),AC0
5496  025174  012704  003000                  MOV     #3000,R4        ;SET FIV AND FIV
5497                                                                  ;CLEAR FD
5498  025200  170104                          LDFPS   R4
5499  025202  012700  026122                  MOV     #BBPAT1,R0      ;FSRC
5500  025206  172010                  BB15:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5501  025210  170205                          STFPS   R5
5502  025212  170011                          SETD                    ;REENTED DOUBLE MODE.
5503  025214  012700  026102                  MOV     #BBDAT0,R0      ;GET THE RESULT
5504  025220  174010                          STD     AC0,(R0)
5505  025222  012701  026112                  MOV     #BBPAT0,R1      ;IS THE RESULT
5506  025226  012702  000002                  MOV     #2,R2           ;CORRECT?
5507  025232  022021                  BB16:   CMP     (R0)+,(R1)+
5508  025234  001402                          BEQ     BB17
5509  025236  000137  025740                  JMP     @#BBER4         ;DATA ERROR F
5510  025242  077205                  BB17:   SOB     R2,BB16
5511  025244  020405                          CMP     R4,R5           ;IS FPS CORRECT?
5512  025246  001402                          BEQ     BB20
5513  025250  000137  025610                  JMP     @#BBER10        ;FPS ERROR.
5514                                  ;EXPONENT DIFFERENCE=24=30 (OCT)
5515  025254                          BB20:
5516  025254  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5517  025256  012737  025304  001236          MOV     #BB21,@#$TMP2
5518  025264  012700  026142                  MOV     #BBPAT3,R0      ;SET UP AC0 OPERAND.
5519  025270  172410                          LDD     (R0),AC0
5520  025272  012704  003000                  MOV     #3000,R4        ;SET FIU,FIV. CLEAR FD.
5521  025276  170104                          LDFPS   R4
5522  025300  012700  026122                  MOV     #BBPAT1,R0      ;FSRC
5523  025304  172010                  BB21:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5524  025306  170205                          STFPS   R5
5525  025310  170011                          SETD                    ;REENTER DOUBLE MODE
5526  025312  012700  026102                  MOV     #BBDAT0,R0      ;GET THE RESULT
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 5527  025316  174010                          STD     AC0,(R0)
 5528  025320  012701  026202                  MOV     #BBP7,R1        ;IS THE RESULT CORRECT?
 5529  025324  012702  000002                  MOV     #2,R2
 5530  025330  022021                  BB22:   CMP     (R0)+,(R1)+
 5531  025332  001415                          BEQ     BB25
 5532  025334  012700  026102                  MOV     #BBDAT0,R0      ;WAS A BAD CONSTANT
 5533  025340  012701  026142                  MOV     #BBPAT3,R1      ;USED (NOT 25) IN
 5534  025344  012702  000002                  MOV     #2,R2           ;THE ALLIGN FLOWS?
 5535  025350  022021                  BB23:   CMP     (R0)+,(R1)+
 5536  025352  001402                          BEQ     BB24
 5537  025354  000137  025774                  JMP     @#BBER5         ;DATA ERROR F
 5538  025360  077205                  BB24:   SOB     R2,BB23
 5539  025362  000137  026012                  JMP     @#BBER6         ;BAD CONSTANT F
 5540  025366  077220                  BB25:   SOB     R2,BB22
 5541  025370  020405                          CMP     R4,R5
 5542  025372  001402                          BEQ     BB26
 5543  025374  000137  025610                  JMP     @#BBER10        ;BAD FPS.
 5544                                  ;EXPONENT DIFFERENCE=1
 5545  025400                          BB26:
 5546  025400  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5547  025402  012737  025430  001236          MOV     #BB27,@#$TMP2
 5548  025410  012704  003200                  MOV     #3200,R4
 5549  025414  170104                          LDFPS   R4              ;SET UP AC0 OPERAND
 5550  025416  012700  026162                  MOV     #BBPAT5,R0
 5551  025422  172410                          LDD     (R0),AC0
 5552  025424  012700  026122                  MOV     #BBPAT1,R0      ;FSRC
 5553  025430  172010                  BB27:   ADDD    (R0),AC0        ;TEST INSTRUCTION
 5554  025432  170205                          STFPS   R5
 5555  025434  012700  026102                  MOV     #BBDAT0,R0      ;GET THE RESULT.
 5556  025440  174010                          STD     AC0,(R0)
 5557  025442  012701  026222                  MOV     #BBP11,R1       ;IS IT CORRECT?
 5558  025446  012702  000004                  MOV     #4,R2
 5559  025452  022021                  BB30:   CMP     (R0)+,(R1)+
 5560  025454  001402                          BEQ     BB31
 5561  025456  000137  026046                  JMP     @#BBER7         ;DATA ERRCR D
 5562  025462  077205                  BB31:   SOB     R2,BB30
 5563  025464  020405                          CMP     R4,R5           ;IS FPS CORRECT
 5564  025466  001402                          BEQ     BB32
 5565  025470  000137  025570                  JMP     @#BBER0
 5566                                  ;EXPONENT DIFFERENCE=100=144 (OCT)
 5567  025474                          BB32:
 5568  025474  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5569  025476  012737  025524  001236          MOV     #BB33,@#$TMP2
 5570  025504  012704  003200                  MOV     #3200,R4
 5571  025510  170104                          LDFPS   R4              ;SET FIV,FIV AND FD
 5572  025512  012700  026172                  MOV     #BBPAT6,R0      ;SET UP AC0 OPERAND.
 5573  025516  172410                          LDD     (R0),AC0
 5574  025520  012700  026122                  MOV     #BBPAT1,R0      ;FSRC
 5575  025524  172010                  BB33:   ADDD    (R0),AC0        ;TEST INSTRUCTION
 5576  025526  170205                          STFPS   R5
 5577  025530  012700  026102                  MOV     #BBDAT0,R0      ;GET THE RESULT
 5578  025534  174010                          STD     AC0,(R0)
 5579  025536  012701  026172                  MOV     #BBPAT6,R1      ;IS IT CORRECT
 5580  025542  012702  000004                  MOV     #4,R2
 5581  025546  022021                  BB34:   CMP     (R0)+,(R1)+
 5582  025550  001402                          BEQ     BB35
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5583  025552  000137  026064                JMP     @#BBER8         ;DATA ERROR D
5584  025556  077205                BB35:   SOB     R2,BB34
5585  025560  020405                        CMP     R4,R5           ;IS FPS CORRECT
5586  025562  001002                        BNE     BBER0
5587  025564  000167  000442                JMP     BBDONE
5588  025570  010437  001242        BBER0:  MOV     R4,@#$TMP4      ;FPS ERROR D
5589  025574  010537  001240                MOV     R5,@#$TMP3
5590  025600  104001                1$:     ERROR   1
5591  025602  104413                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
5592                                                                ;SEE IF THE USER HAS EXPRESSED
5593                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
5594                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
5595                                                                ;THE USER TYPED CONTROL G?).
5596  025604  000137  026232                JMP     @#BBDONE
5597  025610  010437  001242        BBER10: MOV     R4,@#$TMP4      ;FPS ERROR F
5598  025614  010537  001240                MOV     R5,@#$TMP3
5599  025620  104002                1$:     ERROR   2
5600  025622  104413                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
5601                                                                ;SEE IF THE USER HAS EXPRESSED
5602                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
5603                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
5604                                                                ;THE USER TYPED CONTROL G?).
5605  025624  000137  026232                JMP     @#BBDONE
5606  025630  012737  026132  001242  BBER1:  MOV     #BBPAT2,@#$TMP4 ;DATA ERROR D
5607  025636  012737  026132  001246          MOV     #BBPAT2,@#$TMP6
5608  025644  012737  026122  001240  BBER11: MOV     #BBPAT1,@#$TMP3
5609  025652  012737  026102  001244          MOV     #BBDAT0,@#$TMP5
5610  025660  104002                1$:     ERROR   2
5611  025662  000137  026232                JMP     @#BBDONE
5612  025666  012737  026152  001242  BBER2:  MOV     #BBPAT4,@#$TMP4
5613  025674  012737  026212  001246          MOV     #BBP10,@#$TMP6
5614  025702  000760                        BR      BBER11
5615  025704  012737  026152  001242  BBER3:  MOV     #BBPAT4,@#$TMP4 ;BAD CONSTANT D
5616  025712  012737  026212  001246          MOV     #BBP10,@#$TMP6
5617  025720  012737  026122  001240          MOV     #BBPAT1,@#$TMP3
5618  025726  012737  026102  001244          MOV     #BBDAT0,@#$TMP5
5619  025734  104002                1$:     ERROR   2
5620  025736  000535                        BR      BBDONE
5621  025740  012737  026112  001242  BBER4:  MOV     #BBPAT0,@#$TMP4 ;DATA ERROR F
5622  025746  012737  026112  001246          MOV     #BBPAT0,@#$TMP6
5623  025754  012737  026122  001240  BBER40: MOV     #BBPAT1,@#$TMP3
5624  025762  012737  026102  001244          MOV     #BBDAT0,@#$TMP5
5625  025770  104002                1$:     ERROR   2
5626  025772  000517                        BR      BBDONE
5627  025774  012737  026142  001242  BBER5:  MOV     #BBPAT3,@#$TMP4
5628  026002  012737  026202  001246          MOV     #BBP7,@#$TMP6
5629  026010  000761                        BR      BBER40
5630  026012  012737  026142  001242  BBER6:  MOV     #BBPAT3,@#$TMP4 ;CONSTANT ERROR F
5631  026020  012737  026202  001246          MOV     #BBP7,@#$TMP6
5632  026026  012737  026122  001240          MOV     #BBPAT1,@#$TMP3
5633  026034  012737  026102  001244          MOV     #BBDAT0,@#$TMP5
5634  026042  104002                1$:     ERROR   2
5635  026044  000472                        BR      BBDONE
5636  026046  012737  026162  001242  BBER7:  MOV     #BBPAT5,@#$TMP4
5637  026054  012737  026122  001246          MOV     #BBPAT11,@#$TMP6
5638  026062  000670                        BR      BBER11
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5639  026064  012737  026172  001242  BBER8:  MOV     #BBPAT6,@#$TMP4
5640  026072  012737  026172  001246          MOV     #BBPAT6,@#$TMP6
5641  026100  000661                  BR      BBER11
5642  026102  000000          BBDAT0: 0
5643  026104  000000                  0
5644  026106  000000                  0
5645  026110  000000                  0
5646  026112  006400          BBPAT0: 6400                    ;F(AC)=E(FSRC)+25=26
5647  026114  000000                  0                       ;               =32(OCT)
5648  026116  000000                  0
5649  026120  000000                  0
5650  026122  000200          BBPAT1: 200
5651  026124  000000                  0                       ;E(FSRC)=1
5652  026126  000000                  0
5653  026130  000000                  0
5654  026132  016400          BBPAT2: 16400
5655  026134  000000                  0                       ;E(AC)=E(FSRC)+57=58
5656  026136  000000                  0                       ;               =72(OCT)
5657  026140  000000                  0
5658  026142  006200          BBPAT3: 6200                    ;E(AC)=E(FSRC)+24=25
5659  026144  000000                  0                       ;               =31(OCT)
5660  026146  000000                  0
5661  026150  000000                  0
5662  026152  016200          BBPAT4: 16200                   ;E(AC)=E(FSR6)+56=57
5663  026154  000000                  0                       ;               =71(OCT)
5664  026156  000000                  0
5665  026160  000000                  0
5666  026162  000400          BBPAT5: 400                     ;E(AC)=E(FSRC)+1=2
5667  026164  000000                  0
5668  026166  000000                  0
5669  026170  000000                  0
5670  026172  031200          BBPAT6: 31200                   ;E(AC)=E(FSRC)+100=101
5671  026174  000000                  0                       ;               =145(OCT)
5672  026176  000000                  0
5673  026200  000000                  0
5674  026202  006200          BBP7:   6200                    ;BBPAT3 RES
5675  026204  000001                  1
5676  026206  000000                  0
5677  026210  000000                  0
5678  026212  016200          BBP10:  16200                   ;BBPAT4 RES
5679  026214  000000                  0
5680  026216  000000                  0
5681  026220  000001                  1
5682  026222  000500          BBP11:  500                     ;BBPAT5 RES
5683  026224  000000                  0
5684  026226  000000                  0
5685  026230  000000                  0
5686  026232                  BBDONE:
5687  026232  104413                  RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
5688                                                          ;SEE IF THE USER HAS EXPRESSED
5689                                                          ;THE DESIRE TO CHANGE THE SOFTWARE
5690                                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
5691                                                          ;THE USER TYPED CONTROL G?).
5692                          ;;**************************************************************
5693                          ;*TEST 34        ADDD WITH NEGATVE OPRANDS TEST
5694                          ;*
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                                ;*THIS IS A TEST OF THE ADDD INSTRUCTION
                                ;*WITH NEGATIVE OPERANDS.  EVERY COMBINATION OF
                                ;*OPERAND SIGNS IS TRIED.
                                ;*
                                ;;*****************************************************************************
026234  000004                  TST34:  SCOPE
                                ;BOTH OPERANDS NEGATIVE
026236                          DD1:
026236  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
026240  012704  003200                  MOV     #3200,R4                ;SET FIO, FIV, AND FD
026244  170104                          LDFPS   R4
026246  012737  026266  001236          MOV     #DD2,@#$TMP2
026254  012700  030116                  MOV     #DDP1,R0                        ;SET AC0 OPERAND
026260  172410                          LDD     (R0),AC0
026262  012700  030116                  MOV     #DDP1,R0                        ;ESRC
026266  172010                  DD2:    ADDD    (R0),AC0                        ;TEST INSTRUCTION
026270  170205                          STFPS   R5                              ;GET FPS
026272  012700  030076                  MOV     #DDDAT0,R0                      ;GET THE RESULT
026276  174010                          STD     AC0,(R0)
026300  012701  030216                  MOV     #DDP9,R1                        ;IS IT CORRECT
026304  012702  000004                  MOV     #4,R2
026310  022021                  DD3:    CMP     (R0)+,(R1)+
026312  001415                          BEQ     DD6
026314  012700  030076                  MOV     #DDDAT0,R0                      ;DID A ADD-SUB
026320  012701  030146                  MOV     #DDP4,R1                        ;FLOW A FAILURE
026324  012702  000004                  MOV     #4,R2
026330  022021                  DD4:    CMP     (R0)+,(R1)+
026332  001402                          BEQ     DD5                             ;216,442,500
026334  000137  027326                  JMP     @#DDER1                         ;DATA ERROR,D
026340  077205                  DD5:    SOB     R2,DD4
026342  000137  027364                  JMP     @#DDER2                         ;FLOW FAILURE,D
026346  077220                  DD6:    SOB     R2,DD3
026350  052704  000010                  BIS     #10,R4
026354  020405                          CMP     R4,R5                           ;FPS CORRECT?
026356  001402                          BEQ     DD7
026360  000137  027310                  JMP     @#DDER0                         ;BAD,FPS
                                ;AC POS FSRC NEG        AC=-FSRC
026364                          DD7:
026364  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
026366  012704  003200                  MOV     #3200,R4                ;SET FIO, FIV, AND FD
026372  170104                          LDFPS   R4
026374  012737  026414  001236          MOV     #DD8,@#$TMP2
026402  012700  030126                  MOV     #DDP2,R0                        ;SET AC0 OPERAND
026406  172410                          LDD     (R0),AC0
026410  012700  030116                  MOV     #DDP1,R0                        ;FSPC
026414  172010                  DD8:    ADDD    (R0),AC0                        ;TEST INSTRUCTION
026416  170205                          STFPS   R5                              ;GET FPS
026420  012700  030076                  MOV     #DDDAT0,R0                      ;GET THE RESULT
026424  174010                          STD     AC0,(R0)
026426  012701  030106                  MOV     #DDP0,R1                        ;IS IT CORRECT
026432  012702  000004                  MOV     #4,R2
026436  022021                  DD10:   CMP     (R0)+,(R1)+
026440  001402                          BEQ     DD11
026442  000137  027422                  JMP     @#DDER3                         ;FLOW FAILURE
026446  077205                  DD11:   SOB     R2,DD10
026450  052704  000004                  BIS     #4,R4
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5751  026454  020405                          CMP     R4,R5                   ;FPS CORRECT?
5752  026456  001402                          BEQ     DD12
5753  026460  000137  027310                  JMP     @#DDER0                 ;BAD FPS
5754                                  ;AC NEG FSRC POS                AC=-FSRC
5755  026464                          DD12:
5756  026464  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
5757  026466  012704  003200                  MOV     #3200,R4                ;SET FIU, FIV, AND FD
5758  026472  170104                          LDFPS   R4
5759  026474  012737  026514  001236          MOV     #DD13,@#$TMP2
5760  026502  012700  030116                  MOV     #DDP1,R0                ;SET AC0 OPERAND
5761  026506  172410                          LDD     (R0),AC0
5762  026510  012700  030126                  MOV     #DDP2,R0                ;FSRC
5763  026514  172010                  DD13:   ADDD    (R0),AC0                ;TEST INSTRUCTION
5764  026516  170205                          STFPS   R5                      ;GET FPS
5765  026520  012700  030076                  MOV     #DDDAT0,R0              ;GET THE RESULT
5766  026524  174010                          STD     AC0,(R0)
5767  026526  012701  030106                  MOV     #DDP0,R1                ;IS IT CORRECT
5768  026532  012702  000004                  MOV     #4,R2
5769  026536  022021                  DD14:   CMP     (R0)+,(R1)+
5770  026540  001402                          BEQ     DD15
5771  026542  000137  027460                  JMP     @#DDER4                 ;FLOW FAILURE 216,440,121
5772  026546  077205                  DD15:   SOB     R2,DD14
5773  026550  052704  000004                  BIS     #4,R4
5774  026554  020405                          CMP     R4,R5                   ;EPS CORRECT?
5775  026556  001402                          BEQ     DD16
5776  026560  000137  027310                  JMP     @#DDER0                 ;BAD FPS
5777                                  ;AC0 POC        FSRC    NEG     /AC/ > /FSRC/
5778  026564                          DD16:
5779  026564  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
5780  026566  012704  003200                  MOV     #3200,R4                ;SET FIV, FIV AND FD
5781  026572  170104                          LDFPS   R4
5782  026574  012737  026614  001236          MOV     #DD17,@#$TMP2
5783  026602  012700  030136                  MOV     #DDP3,R0                ;SET AC0 OPERAND
5784  026606  172410                          LDD     (R0),AC0
5785  026610  012700  030166                  MOV     #DDP6,R0                ;ESPC
5786  026614  172010                  DD17:   ADDD    (R0),AC0                ;TEST INSTRUCTION
5787  026616  170205                          STFPS   R5                      ;GET FPS
5788  026620  012700  030076                  MOV     #DDDAT0,R0              ;GET THE RESULT
5789  026624  174010                          STD     AC0,(R0)
5790  026626  012701  030176                  MOV     #DDP7,R1                ;IS IT CORRECT
5791  026632  012702  000004                  MOV     #4,R2
5792  026636  022021                  DD18:   CMP     (R0)+,(R1)+
5793  026640  001415                          BEQ     DD21
5794  026642  012700  030076                  MOV     #DDDAT0,R0              ;FLOWS FAILURE
5795  026646  012701  030206                  MOV     #DDP8,R1                ;216,440,101
5796  026652  012702  000004                  MOV     #4,R2                   ;GET GENERATED
5797  026656  022021                  DD19:   CMP     (R0)+,(R1)+
5798  026660  001402                          BEQ     DD20
5799  026662  000137  027516                  JMP     @#DDER5         ;DATA ERROR.
5800  026666  077205                  DD20:   SOB     R2,DD19
5801  026670  000137  027554                  JMP     @#DDER6
5802  026674  077220                  DD21:   SOB     R2,DD18
5803  026676  020405                          CMP     R4,R5                   ;EPS CORRECT?
5804  026700  001402                          BEQ     DD22
5805  026702  000137  027310                  JMP     @#DDER0                 ;BAD FPS
5806                                  ;AC NEG FSRC    POS     /FSRC/ > /AC/
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5807  026706                                DD22:
5808  026706  104414                              LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5809  026710  012704  003200                      MOV     #3200,R4                ;SET FIO,FIV, AND FD
5810  026714  170104                              LDFPS   R4
5811  026716  012737  026736  001236              MOV     #DD23,@#$TMP2
5812  026724  012700  030166                      MOV     #DDP6,R0                ;SET AC0 OPERAND
5813  026730  172410                              LDD     (R0),AC0
5814  026732  012700  030136                      MOV     #DDP3,R0                ;FSPC
5815  026736  172010                      DD23:   ADDD    (R0),AC0                ;TEST INSTRUCTION
5816  026740  170205                              STFPS   R5                      ;GET FPS
5817  026742  012700  030076                      MOV     #DDDATO,R0              ;GET THE RESULT
5818  026746  174010                              STD     AC0,(R0)
5819  026750  012701  030176                      MOV     #DDP7,R1                ;IS IT CORRECT?
5820  026754  012702  000004                      MOV     #4,R2
5821  026760  022021                      DD24:   CMP     (R0)+,(R1)+
5822  026762  001415                              BEQ     DD27
5823  026764  012700  030076                      MOV     #DDDATO,R0              ;FLO,S FAILURE
5824  026770  012701  030206                      MOV     #DDP8,R1                ;CONSTANT (NOT 57)
5825  026774  012702  000004                      MOV     #4,R2                   ;216,042,101
5826  027000  021011                      DD25:   CMP     (R0),(R1)
5827  027002  001402                              BEQ     DD26
5828  027004  000137  027612                      JMP     @#DDER7                 ;DATA ERROR.
5829  027010  077205                      DD26:   SOB     R2,DD25
5830  027012  000137  027650                      JMP     @#DDER8
5831  027016  077220                      DD27:   SOB     R2,DD24
5832  027020  020405                              CMP     R4,R5                   ;FPS CORRECT?
5833  027022  001402                              BEQ     DD30
5834  027024  000137  027310                      JMP     @#DDER0                 ;BAD FPS
5835                                      ;AC0 POS        FSRC    NEG     /AC/</FRSRC/
5836  027030                              DD30:
5837  027030  104414                              LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5838  027032  012704  003200                      MOV     #3200,R4                ;SET FIO,FIV,AND FD
5839  027036  170104                              LDFPS   R4
5840  027040  012737  027060  001236              MOV     #DD31,@#$TMP2
5841  027046  012700  030146                      MOV     #DDP4,R0                ;SET AC0 OPERAND
5842  027052  172410                              LDD     (R0),AC0
5843  027054  012700  030156                      MOV     #DDP5,R0                ;FSPC
5844  027060  172010                      DD31:   ADDD    (R0),AC0                ;TEST INSTRUCTION
5845  027062  170205                              STFPS   R5                      ;GET FPS
5846  027064  012700  030076                      MOV     #DDDATO,R0              ;GET THE RESULT
5847  027070  174010                              STD     AC0,(R0)
5848  027072  012701  030206                      MOV     #DDP8,R1                ;IS IT CORRECT
5849  027076  012702  000004                      MOV     #4,R2
5850  027102  022021                      DD32:   CMP     (R0)+,(R1)+
5851  027104  001415                              BEQ     DD35                    ;ADD-SUB
5852  027106  012700  030076                      MOV     #DDDATO,R0              ;FLOWAS FAILURE
5853  027112  012701  030176                      MOV     #DDP7,R1                ;CON 216 N440 NOT 141
5854  027116  012702  000004                      MOV     #4,R2           ;GET GENERATED
5855  027122  022021                      DD33:   CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
5856  027124  001402                              BEQ     DD34                    ;FLOWS?
5857  027126  000137  027706                      JMP     @#DDER9                 ;DATA ERROR, D
5858  027132  077205                      DD34:   SOB     R2,DD33
5859  027134  000137  027744                      JMP     @#DDER10
5860  027140  077220                      DD35:   SOB     R2,DD32
5861  027142  052704  000010                      BIS     #10,R4
5862  027146  020405                              CMP     R4,R5                   ;FPS CORRECT?
```

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5863  027150  001402                          BEQ     #DD36
5864  027152  000137  027310                  JMP     @#DDER0                 ;BAD FPS
5865                                  ;AC0 NEG        FSRC    POS     /FSRC/</AC/
5866  027156                          DD36:
5867  027156  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5868  027160  012704  003200                  MOV     #3200,R4                ;SET FIO, FIV, AND FD
5869  027164  170104                          LDFPS   R4
5870  027166  012737  027206  001236          MOV     #DD37,@#$TMP2
5871  027174  012700  030156                  MOV     #DDP5,R0                ;SET AC0 OPERAND
5872  027200  172410                          LDD     (R0),AC0
5873  027202  012700  030146                  MOV     #DDP4,R0                ;FSPC
5874  027206  172010                  DD37:   ADDD    (R0),AC0                ;TEST INSTRUCTION
5875  027210  170205                          STFPS   R5                      ;GET FPS
5876  027212  012700  030076                  MOV     #DDDAT0,R0              ;GET THE RESULT
5877  027216  174010                          STD     AC0,(R0)
5878  027220  012701  030206                  MOV     #DDP8,R1                ;IS IT CORRECT
5879  027224  012702  000004                  MOV     #4,R2
5880  027230  022021                  DD38:   CMP     (R0)+,(R1)+
5881  027232  001415                          BEQ     DD41
5882  027234  012700  030076                  MOV     #DDDAT0,R0              ;ADD SUB
5883  027240  012701  030176                  MOV     #DDP7,R1                ;FLOWS FAILURES
5884  027244  012702  000004                  MOV     #4,R2                   ;GET 216,042,141
5885  027250  022021                  DD39:   CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
5886  027252  001402                          BEQ     DD40                    ;FLOWS?
5887  027254  000137  030002                  JMP     @#DDER11                ;DATA ERROR. D
5888  027260  077205                  DD40:   SOB     R2,DD39
5889  027262  000137  030040                  JMP     @#DDER12                ;BAD CONSTANT.D
5890  027266  077220                  DD41:   SOB     R2,DD38
5891  027270  052704  000010                  BIS     #10,R4
5892  027274  020405                          CMP     R4,R5                   ;FPS CORRECT?
5893  027276  001402                          BEQ     DD42
5894  027300  000137  027310                  JMP     @#DDER0                 ;BAD FPS
5895  027304  000137  030226          DD42:   JMP     @#DDDONE
5896  027310  010437  001242          DDER0:  MOV     R4,@#$TMP4              ;FPS ERROR
5897  027314  010537  001240                  MOV     R5,@#$TMP3
5898  027320  104002                  1$:     ERROR   2
5899  027322  000137  030226                  JMP     @#DDDONE
5900  027326                          DDER1:
5901  027326  012737  030116  001240          MOV     #DDP1,@#$TMP3
5902  027334  012737  030116  001242          MOV     #DDP1,@#$TMP4
5903  027342  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
5904  027350  012737  030116  001246          MOV     #DDP1,@#$TMP6
5905  027356  104002                  1$:     ERROR   2
5906  027360  000137  030226                  JMP     @#DDDONE
5907  027364                          DDER2:
5908  027364  012737  030116  001240          MOV     #DDP1,@#$TMP3
5909  027372  012737  030116  001242          MOV     #DDP1,@#$TMP4
5910  027400  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
5911  027406  012737  030216  001246          MOV     #DDP9,@#$TMP6
5912  027414  104002                  1$:     ERROR   2
5913  027416  000137  030226                  JMP     @#DDDONE
5914  027422                          DDER3:
5915  027422  012737  030116  001240          MOV     #DDP1,@#$TMP3
5916  027430  012737  030126  001242          MOV     #DDP2,@#$TMP4
5917  027436  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
5918  027444  012737  030106  001246          MOV     #DDP0,@#$TMP6
```

```
 5919  027452  104002                  1$:     ERROR   2
 5920  027454  000137  030226                  JMP     @#DDDONE
 5921  027460                          DDER4:
 5922  027460  012737  030126  001240          MOV     #DDP2,@#$TMP3
 5923  027466  012737  030116  001242          MOV     #DDP1,@#$TMP4
 5924  027474  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
 5925  027502  012737  030106  001246          MOV     #DDP0,@#$TMP6
 5926  027510  104002                  1$:     ERROR   2
 5927  027512  000137  030226                  JMP     @#DDDONE
 5928  027516                          DDER5:
 5929  027516  012737  030166  001240          MOV     #DDP6,@#$TMP3
 5930  027524  012737  030136  001242          MOV     #DDP3,@#$TMP4
 5931  027532  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
 5932  027540  012737  030176  001246          MOV     #DDP7,@#$TMP6
 5933  027546  104002                  1$:     ERROR   2
 5934  027550  000137  030226                  JMP     @#DDDONE
 5935  027554                          DDER6:
 5936  027554  012737  030166  001240          MOV     #DDP6,@#$TMP3
 5937  027562  012737  030136  001242          MOV     #DDP3,@#$TMP4
 5938  027570  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
 5939  027576  012737  030176  001246          MOV     #DDP7,@#$TMP6
 5940  027604  104002                  1$:     ERROR   2
 5941  027606  000137  030226                  JMP     @#DDDONE
 5942  027612                          DDER7:
 5943  027612  012737  030136  001240          MOV     #DDP3,@#$TMP3
 5944  027620  012737  030166  001242          MOV     #DDP6,@#$TMP4
 5945  027626  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
 5946  027634  012737  030176  001246          MOV     #DDP7,@#$TMP6
 5947  027642  104002                  1$:     ERROR   2
 5948  027644  000137  030226                  JMP     @#DDDONE
 5949  027650                          DDER8:
 5950  027650  012737  030136  001240          MOV     #DDP3,@#$TMP3
 5951  027656  012737  030166  001242          MOV     #DDP6,@#$TMP4
 5952  027664  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
 5953  027672  012737  030176  001246          MOV     #DDP7,@#$TMP6
 5954  027700  104002                  1$:     ERROR   2
 5955  027702  000137  030226                  JMP     @#DDDONE
 5956  027706                          DDER9:
 5957  027706  012737  030156  001240          MOV     #DDP5,@#$TMP3
 5958  027714  012737  030146  001242          MOV     #DDP4,@#$TMP4
 5959  027722  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
 5960  027730  012737  030206  001246          MOV     #DDP8,@#$TMP6
 5961  027736  104002                  1$:     ERROR   2
 5962  027740  000137  030226                  JMP     @#DDDONE
 5963  027744                          DDER10:
 5964  027744  012737  030156  001240          MOV     #DDP5,@#$TMP3
 5965  027752  012737  030146  001242          MOV     #DDP4,@#$TMP4
 5966  027760  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
 5967  027766  012737  030206  001246          MOV     #DDP8,@#$TMP6
 5968  027774  104002                  1$:     ERROR   2
 5969  027776  000137  030226                  JMP     @#DDDONE
 5970  030002                          DDER11:
 5971  030002  012737  030146  001240          MOV     #DDP4,@#$TMP3
 5972  030010  012737  030156  001242          MOV     #DDP5,@#$TMP4
 5973  030016  012737  030076  001244          MOV     #DDDAT0,@#$TMP5
 5974  030024  012737  030206  001246          MOV     #DDP8,@#$TMP6
```

```
 5975  030032  104002                  1$:     ERROR   2
 5976  030034  000137  030226                  JMP     @#DDDONE
 5977  030040                          DDER12:
 5978  030040  012737  030146  001240          MOV     #DDP4,@#$TMP3
 5979  030046  012737  030156  001242          MOV     #DDP5,@#$TMP4
 5980  030054  012737  030076  001244          MOV     #DDDATO,@#$TMP5
 5981  030062  012737  030206  001246          MOV     #DDP8,@#$TMP6
 5982  030070  104002                  1$:     ERROR   2
 5983  030072  000137  030226                  JMP     @#DDDONE
 5984  030076  000000                  DDDATO: 0
 5985  030100  000000                          0
 5986  030102  000000                          0
 5987  030104  000000                          0
 5988  030106  000000                  DDP0:   0
 5989  030110  000000                          0
 5990  030112  000000                          0
 5991  030114  000000                          0
 5992  030116  100200                  DDP1:   100200                          ;-DDP2
 5993  030120  000000                          0
 5994  030122  000000                          0
 5995  030124  000000                          0
 5996  030126  000200                  DDP2:   200                             ;-DDP1
 5997  030130  000000                          0
 5998  030132  000000                          0
 5999  030134  000000                          0
 6000  030136  001100                  DDP3:   1100                            ;EXP=4
 6001  030140  000000                          0                               ;FRAC=...110...
 6002  030142  000000                          0
 6003  030144  000000                          0
 6004  030146  000600                  DDP4:   600                             ;EXP=3
 6005  030150  000000                          0                               ;FRAC=...100...
 6006  030152  000000                          0
 6007  030154  000000                          0
 6008  030156  101100                  DDP5:   101100                          ;-DDP3
 6009  030160  000000                          0
 6010  030162  000000                          0
 6011  030164  000000                          0
 6012  030166  100600                  DDP6:   100600                          ;-DDP4
 6013  030170  000000                          0
 6014  030172  000000                          0
 6015  030174  000000                          0
 6016  030176  001000                  DDP7:   1000                            ;DDP3+DDP6
 6017  030200  000000                          0
 6018  030202  000000                          0
 6019  030204  000000                          0
 6020  030206  101000                  DDP8:   101000                          ;DDP5+DDP4
 6021  030210  000000                          0
 6022  030212  000000                          0
 6023  030214  000000                          0
 6024  030216  100400                  DDP9:   100400                          ;DDP1+DDP1
 6025  030220  000000                          0
 6026  030222  000000                          0
 6027  030224  000000                          0
 6028  030226  000005                  DDDONE:         RESET
 6029                                  ;;*************************************************************
 6030                                  ;*TEST 35        SUBD TEST
```

```
 6031                                   ;*
 6032                                   ;* THIS IS A TEST OF THE SUBD INSTRUCTION.
 6033                                   ;* BOTH A POSITIVE AND A NEGATIVE NUMBER
 6034                                   ;* IS SUBTRACTED FROM IT SELF
 6035                                   ;*
 6036                                   ;;*****************************************************************
 6037  030230  000004                   TST35:  SCOPE
 6038                                   ;       USE POSITIVE OPERANDS
 6039  030232                           EE1:
 6040  030232  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 6041  030234  012704  003200                   MOV     #3200,R4                ;SET FIU, FIV, AND FD
 6042  030240  170104                           LDFPS   R4
 6043  030242  012737  030262  001236           MOV     #EE2,@#$TMP2
 6044  030250  012700  030742                   MOV     #EEP1,R0                ;SET AC0 OPERAND
 6045  030254  172410                           LDD     (R0),AC0
 6046  030256  012700  030742                   MOV     #EEP1,R0                ;FSPC
 6047  030262  173010                   EE2:    SUBD    (R0),AC0                ;TEST INSTRUCTION
 6048  030264  170205                           STFPS   R5                      ;GET FPS
 6049  030266  012700  030720                   MOV     #EEDAT0,R0              ;GET THE RESULT
 6050  030272  174010                           STD     AC0,(R0)
 6051  030274  012701  030730                   MOV     #EEP0,R1                ;IS IT CORRECT?
 6052  030300  012702  000004                   MOV     #4,R2
 6053  030304  022021                   EE3:    CMP     (R0)+,(R1)+
 6054  030306  001415                           BEQ     EE6
 6055  030310  012700  030720                   MOV     #EEDAT0,R0              ;DID A BAD
 6056  030314  012701  030752                   MOV     #EEP2,R1                ;CONSTANT (NOT 57)
 6057  030320  012702  000004                   MOV     #4,R2                   ;GET GENERATED
 6058  030324  022021                   EE4:    CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
 6059  030326  001402                           BEQ     EE5                     ;FLOWS?
 6060  030330  000137  030530                   JMP     @#EEER1                 ;DATA ERROR.D
 6061  030334  077205                   EE5:    SOB     R2,EE4
 6062  030336  000137  030566                   JMP     @#EEER2                 ;BAD CONSTANT.D
 6063  030342  077220                   EE6:    SOB     R2,EE3
 6064  030344  052704  000004                   BIS     #4,R4
 6065  030350  020405                           CMP     R4,R5                   ;FPS CORRECT?
 6066  030352  001402                           BEQ     EE7
 6067  030354  000137  030512                   JMP     @#EEER0                 ;BAD FPS
 6068                                   ;USE NEGATIVE OPERANDS
 6069  030360                           EE7:
 6070  030360  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 6071  030362  012704  003200                   MOV     #3200,R4                ;SET FIO, FIV, AND FD
 6072  030366  170104                           LDFPS   R4
 6073  030370  012737  030410  001236           MOV     #EE8,@#$TMP2
 6074  030376  012700  030762                   MOV     #EEP3,R0                ;SET AC0 OPERAND
 6075  030402  172410                           LDD     (R0),AC0
 6076  030404  012700  030762                   MOV     #EEP3,R0                ;FSPC
 6077  030410  173010                   EE8:    SUBD    (R0),AC0                ;TEST INSTRUCTION
 6078  030412  170205                           STFPS   R5                      ;GET FPS
 6079  030414  012700  030720                   MOV     #EEDAT0,R0              ;GET THE RESULT
 6080  030420  174010                           STD     AC0,(R0)
 6081  030422  012701  030730                   MOV     #EEP0,R1                ;IS IT CORRECT?
 6082  030426  012702  000C04                   MOV     #4,R2
 6083  030432  022021                   EE9:    CMP     (R0)+,(R1)+
 6084  030434  001415                           BEQ     EE12
 6085  030436  012700  030720                   MOV     #EEDAT0,R0              ;DID A BAD
 6086  030442  012701  030772                   MOV     #EEP4,R1                ;CONSTANT (NOT 57)
```

```
6087  030446  012702  000004          MOV     #4,R2                   ;GET GENERATED
6088  030452  022021          EE10:   CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
6089  030454  001402                  BEQ     EE11                    ;FLOWS?
6090  030456  000137  030624          JMP     @#EEER3                 ;DATA ERROR.D
6091  030462  077205          EE11:   SOB     R2,EE10
6092  030464  000137  030662          JMP     @#EEER4                 ;BAD CONSTANT.D
6093  030470  077220          EE12:   SOB     R2,EE9
6094  030472  052704  000004          BIS     #4,R4
6095  030476  020405                  CMP     R4,R5                   ;FPS CORRECT?
6096  030500  001402                  BEQ     EE13
6097  030502  000137  030512          JMP     @#EEER0                 ;BAD FPS.
6098  030506  000137  031002  EE13:   JMP     @#EEDONE
6099  030512  010437  001242  EEER0:  MOV     R4,@#$TMP4              ;BAD FPS
6100  030516  010537  001240          MOV     R5,@#$TMP3
6101  030522  104002          1$:     ERROR   2
6102  030524  000137  031002          JMP     @#EEDONE
6103  030530                  EEER1:
6104  030530  012737  030742  001240  MOV     #EEP1,@#$TMP3
6105  030536  012737  030742  001242  MOV     #EEP1,@#$TMP4
6106  030544  012737  030720  001244  MOV     #EEDAT0,@#$TMP5
6107  030552  012737  030730  001246  MOV     #EEP0,@#$TMP6
6108  030560  104002          1$:     ERROR   2
6109  030562  000137  031002          JMP     @#EEDONE
6110  030566                  EEER2:
6111  030566  012737  030742  001240  MOV     #EEP1,@#$TMP3
6112  030574  012737  030742  001242  MOV     #EEP1,@#$TMP4
6113  030602  012737  030720  001244  MOV     #EEDAT0,@#$TMP5
6114  030610  012737  030730  001246  MOV     #EEP0,@#$TMP6
6115  030616  104002          1$:     ERROR   2
6116  030620  000137  031002          JMP     @#EEDONE
6117  030624                  EEER3:
6118  030624  012737  030762  001240  MOV     #EEP3,@#$TMP3
6119  030632  012737  030762  001242  MOV     #EEP3,@#$TMP4
6120  030640  012737  030720  001244  MOV     #EEDAT0,@#$TMP5
6121  030646  012737  030730  001246  MOV     #EEP0,@#$TMP6
6122  030654  104002          1$:     ERROR   2
6123  030656  000137  031002          JMP     @#EEDONE
6124  030662                  EEER4:
6125  030662  012737  030762  001240  MOV     #EEP3,@#$TMP3
6126  030670  012737  030762  001244  MOV     #EEP3,@#$TMP4
6127  030676  012737  030720  001244  MOV     #EEDAT0,@#$TMP5
6128  030704  012737  030730  001246  MOV     #EEP0,@#$TMP6
6129  030712  104002          1$:     ERROR   2
6130  030714  000137  031002          JMP     @#EEDONE
6131  030720  000000          EEDAT0: 0
6132  030722  000000                  0
6133  030724  000000                  0
6134  030726  000000                  0
6135  030730  000000          EEP0:   0
6136  030732  000000                  0
6137  030734  000000          00000
6138  030736  000000                  0
6139  030740  000000                  0
6140  030742  000200          EEP1:   200
6141  030744  000000                  0
6142  030746  000000                  0
```

```
 6143  030750  000000                        0
 6144  030752  000400                EEP2:   400
 6145  030754  000000                        0
 6146  030756  000000                        0
 6147  030760  000000                        0
 6148  030762  100200                EEP3:   100200
 6149  030764  000000                        0
 6150  030766  000000                        0
 6151  030770  000000                        0
 6152  030772  100400                EEP4:   100400
 6153  030774  000000                        0
 6154  030776  000000                        0
 6155  031000  000000                        0
 6156  031002                        EEDONE:
 6157  031002  104413                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 6158                                                                ;SEE IF THE USER HAS EXPRESSED
 6159                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
 6160                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 6161                                                                ;THE USER TYPED CONTROL G?).
 6162                                ;;**************************************************************
 6163                                ;*TEST 36       NORMALIZE ALGORITHM TEST
 6164                                ;*
 6165                                ;* THIS IS A TEST OF THE NORMALIZE
 6166                                ;* FLOW ALGORITHM.  TWO PATTERNS ARE USED,
 6167                                ;* FIRST THE MINIMUM SITUATION REQUIRING ONE
 6168                                ;* LEFT SHIFT AND THEN THE MAXIMUM SITUATION
 6169                                ;* REQUIRING 56 SHIFTS.
 6170                                ;*
 6171                                ;;**************************************************************
 6172  031004  000004                TST36:  SCOPE
 6173                                ;USE DATA PATTERNS THAT REQUIRE ONLY ONE LEFT SHIFT TO NORMALIZE
 6174  031006                        FF1:
 6175  031006  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 6176  031010  012704  003200                MOV     #3200,R4                ;SET FIO, FIV, AND FD
 6177  031014  170104                        LDFPS   R4
 6178  031016  012737  031036  001236        MOV     #FF2,@#$TMP2
 6179  031024  012700  031330                MOV     #FFP2,R0                ;SET AC0 OPERAND
 6180  031030  172410                        LDD     (R0),AC0
 6181  031032  012700  031340                MOV     #FFP3,R0                ;FSPC
 6182  031036  172010                FF2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
 6183  031040  170205                        STFPS   R5                      ;GET FPS
 6184  031042  012700  031300                MOV     #FFDAT0,R0              ;GET THE RESULT
 6185  031046  174010                        STD     AC0,(R0)
 6186  031050  012701  031350                MOV     #FFP4, R1               ;IS IT CORRECT
 6187  031054  012702  000004                MOV     #4,R2
 6188  031060  022021                FF3:    CMP     (R0)+,(R1)+
 6189  031062  001401                        BEQ     FF4
 6190  031064  000466                        BR      FFER2                   ;BAD DATA
 6191  031066  077204                FF4:    SOB     R2,FF3
 6192  031070  020405                        CMP     R4,R5                   ;FPS CORRECT?
 6193  031072  001401                        BEQ     FF5
 6194  031074  000435                        BR      FFER0                   ;BAD FPS
 6195                                ;USE DATA PATTERNS WHICH REQUIRE 56 LEFT SHIFTS TO NORMALIZE
 6196                                ;THE RESULT
 6197  031076                        FF5:
 6198  031076  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
```

```
6199  031100  012704  003200          MOV     #3200,R4                ;SET FIU, FIV, AND FD
6200  031104  170104                  LDFPS   R4
6201  031106  012737  031126  001236  MOV     #FF6,@#$TMP2
6202  031114  012700  031310          MOV     #FFP0,R0                ;SET AC0 OPERAND
6203  031120  172410                  LDD     (R0),AC0
6204  031122  012700  031320          MOV     #FFP1,R0                ;FSRC
6205  031126  172010              FF6:ADDD    (R0),AC0                ;TEST INSTRUCTION
6206  031130  170205                  STFPS   R5                      ;GET FPS
6207  031132  012700  031300          MOV     #FFDAT0,R0              ;GET THE RESULT
6208  031136  174010                  STD     AC0,(R0)
6209  031140  012701  031350          MOV     #FFP4,R1                ;IS IT CORRECT
6210  031144  012702  000004          MOV     #4,R2
6211  031150  022021              FF7:CMP     (R0)+,(R1)+
6212  031152  001401                  BEQ     FF10
6213  031154  000413                  BR      FFER1                   ;BATA
6214  031156  077204              FF10:SOB    R2,FF7
6215  031160  020405                  CMP     R4,R5                   ;FPS CORRECT?
6216  031162  001401                  BEQ     FF11
6217  031164  000401                  BR      FFER0           ;BAD FPS
6218  031166  000474              FF11:BR     FFDONE
6219
6220  031170  010537  001240  FFER0: MOV     R5,@#$TMP3
6221  031174  010437  001242          MOV     R4,@#$TMP4
6222  031200  104002              1$: ERROR   2
6223  031202  000466                  BR      FFDONE
6224
6225  031204                  FFER1:
6226  031204  012737  031320  001240          MOV     #FFP1,@#$TMP3
6227  031212  012737  031310  001242          MOV     #FFP0,@#$TMP4
6228  031220  012737  031300  001244          MOV     #FFDAT0,@#$TMP5
6229  031226  012737  031350  001246          MOV     #FFP4,@#$TMP6
6230  031234  104001                  1$:     ERROR   1
6231  031236  000137  031360                  JMP     @#FFDONE
6232
6233  031242                  FFER2:
6234  031242  012737  031340  001240          MOV     #FFP3,@#$TMP3
6235  031250  012737  031330  001242          MOV     #FFP2,@#$TMP4
6236  031256  012737  031300  001244          MOV     #FFDAT0,@#$TMP5
6237  031264  012737  031350  001246          MOV     #FFP4,@#$TMP6
6238  031272  104001                  1$:     ERROR   1
6239  031274  000137  031360                  JMP     @#FFDONE
6240
6241
6242  031300  000000          FFDAT0: 0
6243  031302  000000                  0
6244  031304  000000                  0
6245  031306  000000                  0
6246
6247  031310  016000          FFP0:   16000
6248  031312  000000                  0
6249  031314  000000                  0
6250  031316  000001                  1
6251  031320  116000          FFP1:   116000
6252  031322  000000                  0
6253  031324  000000                  0
6254  031326  000000                  0
```

```
 6255  031330  000500                  FFP2:   500
 6256  031332  000000                          0
 6257  031334  000000                          0
 6258  031336  000000                          0
 6259  031340  100400                  FFP3:   100400
 6260  031342  000000                          0
 6261  031344  000000                          0
 6262  031346  000000                          0
 6263  031350  000200                  FFP4:   200                     ;FFP4=FFP0+FFP1
 6264  031352  000000                          0                       ;    =FFP3+FFP4
 6265  031354  000000                          0
 6266  031356  000000                          0
 6267
 6268  031360                          FFDONE:
 6269
 6270
 6271  031360                          TST37:
 6272
 6273
 6274
 6275                                  ;*****************************************************************************
 6276                                  ;*****************************************************************************
 6277                                  ;FLOATING POINT SECOND PART
 6278                                  ;*****************************************************************************
 6279                                  ;*****************************************************************************
 6280
 6281
 6282                                  ;;***************************************************************************
 6283                                  ;*TEST 37       ROUND\TRUNK TEST
 6284                                  ;*
 6285                                  ;* THIS IS A TEST OF THE ROUND\TRUNK
 6286                                  ;* FLOWS.  IN PARTICULAR TWO THINGS ARE TESTED:
 6287                                  ;* FIRST A CONDITION IN WHICH ROUNDING
 6288                                  ;* RESULTS IN THE NEED FOR RENORMALIZATION, AND
 6289                                  ;* SECOND  THE PSW CONDITION CODES N AND
 6290                                  ;* Z BIT COMMBINATIONS
 6291                                  ;*
 6292                                  ;;***************************************************************************
 6293  031360  000004                  TST37:  SCOPE
 6294
 6295                                          ;ROUND AND NORMALIZE TEST
 6296
 6297  031362                          HH1:
 6298  031362  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 6299  031364  012704  003200                  MOV     #3200,R4                ;SET FIU, FIV, AND FD
 6300  031370  170104                          LDFPS   R4
 6301  031372  012737  031412  001236          MOV     #HH2,@#$TMP2
 6302  031400  012700  033142                  MOV     #HHP0,R0                ;SET AC0 OPERAND
 6303  031404  172410                          LDD     (R0),AC0
 6304  031406  012700  033152                  MOV     #HHP1,R0                ;FSPC
 6305  031412  172010                  HH2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
 6306  031414  170205                          STFPS   R5                      ;GET FPS
 6307  031416  012700  033132                  MOV     #HHDAT0,R0              ;GET THE RESULT
 6308  031422  174010                          STD     AC0,(R0)
 6309  031424  012701  033162                  MOV     #HHP2,R1                ;IS IT CORRECT
 6310  031430  012702  000004                  MOV     #4,R2
```

```
6311  031434  022021                  HH3:    CMP     (R0)+,(R1)+
6312  031436  001415                          BEQ     HH6
6313  031440  012700  033132                  MOV     #HHDAT0,R0              ;DID FLOW GO
6314  031444  012701  033172                  MOV     #HHP3,R1                ;FROM STATE 663
6315  031450  012702  000004                  MOV     #4,R2                   ;TO 313 INSTEAD
6316  031454  022021                  HH4:    CMP     (R0)+,(R1)+             ;OF TO 353
6317  031456  001402                          BEQ     HH5
6318  031460  000137  032152                  JMP     @#HHER0
6319  031464  077205                  HH5:    SOB     R2,HH4
6320  031466  000137  032220                  JMP     @#HHER1
6321  031472  077220                  HH6:    SOB     R2,HH3
6322  031474  020405                          CMP     R4,R5           ;FPS CORRECT?
6323  031476  001402                          BEQ     HH7
6324  031500  000137  032266                  JMP     @#HHER00
6325
6326                                  ;THIS IS A TEST OF THE ABILITY
6327                                  ;OF NORMALIZE TO PRODUCE A ZERO EXP. AND
6328                                  ;OF THE R\T ALGORITHM TO PROPERLY SET THE FPS
6329
6330  031504                          HH7:
6331  031504  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6332  031506  012704  043200                  MOV     #043200,R4              ;SET FIU,FIV,AND FD
6333                                                                          ;FID
6334  031512  170104                          LDFPS   R4
6335  031514  012737  031542  001236          MOV     #HH8,@#$TMP2            ;IN CASE UNDERFLOW
6336  031522  012737  033062  000244          MOV     #HHTRAP,@#FPVECT        ;TRAP OCCURS
6337  031530  012700  033212                  MOV     #HHP5,R0                ;SET AC0 OPERAND
6338  031534  172410                          LDD     (R0),AC0
6339  031536  012700  033222                  MOV     #HHP6,R0                ;FSPC
6340  031542  172010                  HH8:    ADDD    (R0),AC0                ;TEST INSTRUCTION
6341  031544  170205                          STFPS   R5                      ;GET FPS
6342  031546  012700  033132                  MOV     #HHDAT0,R0              ;GET THE RESULT
6343  031552  174010                          STD     AC0,(R0)
6344  031554  012701  033202                  MOV     #HHP4,R1                ;IS IT CORRECT
6345  031560  012702  000004                  MOV     #4,R2
6346  031564  022021                  HH9:    CMP     (R0)+,(R1)+
6347  031566  001402                          BEQ     HH10
6348  031570  000137  032334                  JMP     @#HHER2
6349  031574  077205                  HH10:   SOB     R2,HH9
6350  031576  052704  100004                  BIS     #100004,R4              ;FPS CORRECT?
6351  031602  020405                          CMP     R4,R5
6352  031604  001402                          BEQ     HH11
6353  031606  000137  032402                  JMP     @#HHER3
6354                                  ;THIS IS A TEST OF THE R\T ALGORITHM'S
6355                                  ;ABILITY TO SET BOTH N AND Z ON A - 0 RESULT.
6356  031612                          HH11:
6357  031612  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6358                                                                          ;SET FIV, FIV, AND FD
6359  031614  012704  043200                  MOV     #043200,R4
6360  031620  170104                          LDFPS   R4
6361  031622  012737  031642  001236          MOV     #HH12,@#$TMP2
6362  031630  012700  033242                  MOV     #HHP8,R0                ;SET AC0 OPERAND
6363  031634  172410                          LDD     (R0),AC0
6364  031636  012700  033252                  MOV     #HHP9,R0                ;FSPC
6365  031642  172010                  HH12:   ADDD    (R0),AC0                ;TEST INSTRUCTION
6366  031644  170205                          STFPS   R5                      ;GET FPS
```

```
 6367  031646  012700  033132                  MOV     #HHDATO,R0              ;GET THE RESULT
 6368  031652  174010                          STD     AC0,(R0)
 6369  031654  012701  033232                  MOV     #HHP7,R1                ;IS IT CORRECT
 6370  031660  012702  000004                  MOV     #4,R2
 6371  031664  022021                  HH13:   CMP     (R0)+,(R1)+
 6372  031666  001415                          BEQ     HH16
 6373  031670  012700  033132                  MOV     #HHDATO,R0
 6374  031674  012701  033202                  MOV     #HHP4,R1
 6375  031700  012702  000004                  MOV     #4,R2
 6376  031704  022021                  HH14:   CMP     (R0)+,(R1)+
 6377  031706  001402                          BEQ     HH15
 6378  031710  000137  032450                  JMP     @#HHER4
 6379  031714  077205                  HH15:   SOB     R2,HH14
 6380  031716  000137  032516                  JMP     @#HHER5
 6381  031722  077220                  HH16:   SOB     R2,HH13
 6382  031724  052704  100014                  BIS     #100014,R4              ;FPS CORRECT?
 6383  031730  020405                          CMP     R4,R5
 6384  031732  001402                          BEQ     HH17
 6385  031734  000137  032564                  JMP     @#HHER6
 6386                                  ;TEST THAT CC ARE CLEARED BY R\T
 6387  031740                          HH17:
 6388  031740  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 6389  031742  012704  000200                  MOV     #00200,R4               ;SET FIV, FIV, AND FD
 6390  031746  170104                          LDFPS   R4
 6391  031750  012737  031776  001236          MOV     #HH18,@#$TMP2
 6392  031756  012737  062534  000244          MOV     #FPSPUR,@#FPVECT
 6393  031764  012700  033242                  MOV     #HHP8,R0                ;SET AC0 OPERAND
 6394  031770  172410                          LDD     (R0),AC0
 6395  031772  012700  033242                  MOV     #HHP8,R0                ;FSPC
 6396  031776  172010                  HH18:   ADDD    (R0),AC0                ;TEST INSTRUCTION
 6397  032000  170205                          STFPS   R5                      ;GET FPS
 6398  032002  012700  033132                  MOV     #HHDATO,R0              ;GET THE RESULT
 6399  032006  174010                          STD     AC0,(R0)
 6400  032010  012701  033262                  MOV     #HHP10,R1               ;IS IT CORRECT
 6401  032014  012702  000004                  MOV     #4,R2
 6402  032020  022021                  HH19:   CMP     (R0)+,(R1)+
 6403  032022  001402                          BEQ     HH20
 6404  032024  000137  032632                  JMP @#HHER7
 6405  032030  077205                  HH20:   SOB     R2,HH19
 6406  032032  052704  000000                  BIS     #00000,R4               ;FPS CORRECT?
 6407  032036  020405                          CMP     R4,R5
 6408  032040  001402                          BEQ     HH21
 6409  032042  000137  032700                  JMP     @#HHER8
 6410                                  ;TEST THAT N IS SET BY R\T
 6411  032046                          HH21:
 6412  032046  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 6413  032050  012704  003200                  MOV     #3200,R4                ;SET FIV, FIV, AND FD
 6414  032054  170104                          LDFPS   R4
 6415  032056  012737  032076  001236          MOV     #HH22,@#$TMP2
 6416  032064  012700  033212                  MOV     #HHP5,R0                ;SET AC0 OPERAND
 6417  032070  172410                          LDD     (R0),AC0
 6418  032072  012700  033212                  MOV     #HHP5,R0                ;FSPC
 6419  032076  172010                  HH22:   ADDD    (R0),AC0                ;TEST INSTRUCTION
 6420  032100  170205                          STFPS   R5                      ;GET FPS
 6421  032102  012700  033132.                 MOV     #HHDATO,R0              ;GET THE RESULT
 6422  032106  174010                          STD     AC0,(R0)
```

```
 6423  032110  012701  033272                HH23:   MOV     #HHP11,R1               ;IS IT CORRECT
 6424  032114  012702  000004                        MOV     #4,R2
 6425  032120  022021                                CMP     (R0)+,(R1)+
 6426  032122  001402                                BEQ     HH24
 6427  032124  000137  032746                        JMP     @#HHER9
 6428  032130  077205                        HH24:   SOB     R2,HH23
 6429  032132  052704  000010                        BIS     #10,R4
 6430  032136  020405                                CMP     R4,R5                   ;FPS CORRECT?
 6431  032140  001402                                BEQ     HH25
 6432  032142  000137  033014                        JMP     @#HHER10
 6433  032146  000137  033302                HH25:   JMP     @#HHDONE
 6434  032152                                HHER0:
 6435  032152  010537  001252                        MOV     R5,@#$TMP10
 6436  032156  010437  001254                        MOV     R4,@#$TMP11
 6437  032162  012737  033152  001240                MOV     #HHP1,@#$TMP3
 6438  032170  012737  033142  001242                MOV     #HHP0,@#$TMP4
 6439  032176  012737  033132  001244                MOV     #HHDAT0,@#$TMP5
 6440  032204  012737  033162  001246                MOV     #HHP2,@#$TMP6
 6441  032212  104002                        1$:     ERROR   2
 6442  032214  000137  033302                        JMP     @#HHDONE
 6443  032220                                HHER1:
 6444  032220  010537  001252                        MOV     R5,@#$TMP10
 6445  032224  010437  001254                        MOV     R4,@#$TMP11
 6446  032230  012737  033152  001240                MOV     #HHP1,@#$TMP3
 6447  032236  012737  033142  001242                MOV     #HHP0,@#$TMP4
 6448  032244  012737  033132  001244                MOV     #HHDAT0,@#$TMP5
 6449  032252  012737  033162  001246                MOV     #HHP2,@#$TMP6
 6450  032260  104002                        1$:     ERROR   2
 6451  032262  000137  033302                        JMP     @#HHDONE
 6452  032266                                HHER00:
 6453  032266  010537  001252                        MOV     R5,@#$TMP10
 6454  032272  010437  001254                        MOV     R4,@#$TMP11
 6455  032276  012737  033152  001240                MOV     #HHP1,@#$TMP3
 6456  032304  012737  033142  001242                MOV     #HHP0,@#$TMP4
 6457  032312  012737  033132  001244                MOV     #HHDAT0,@#$TMP5
 6458  032320  012737  033162  001246                MOV     #HHP2,@#$TMP6
 6459  032326  104002                        1$:     ERROR   2
 6460  032330  000137  033302                        JMP     @#HHDONE
 6461  032334                                HHER2:
 6462  032334  010537  001252                        MOV     R5,@#$TMP10
 6463  032340  010437  001254                        MOV     R4,@#$TMP11
 6464  032344  012737  033222  001240                MOV     #HHP6,@#$TMP3
 6465  032352  012737  033212  001242                MOV     #HHP5,@#$TMP4
 6466  032360  012737  033132  001244                MOV     #HHDAT0,@#$TMP5
 6467  032366  012737  033202  001246                MOV     #HHP4,@#$TMP6
 6468  032374  104002                        1$:     ERROR   2
 6469  032376  000137  033302                        JMP     @#HHDONE
 6470  032402                                HHER3:
 6471  032402  010537  001252                        MOV     R5,@#$TMP10
 6472  032406  010437  001254                        MOV     R4,@#$TMP11
 6473  032412  012737  033222  001240                MOV     #HHP6,@#$TMP3
 6474  032420  012737  033212  001242                MOV     #HHP5,@#$TMP4
 6475  032426  012737  033132  001244                MOV     #HHDAT0,@#$TMP5
 6476  032434  012737  033202  001246                MOV     #HHP4,@#$TMP6
 6477  032442  104002                        1$:     ERROR   2
 6478  032444  000137  033302                        JMP     @#HHDONE
```

```
6479  032450
6480  032450  010537  001252                HHER4:
6481  032454  010437  001254                        MOV     R5,@#$TMP10
6482  032460  012737  033252  001240                MOV     R4,@#$TMP11
6483  032466  012737  033242  001242                MOV     #HHP9,@#$TMP3
6484  032474  012737  033132  001244                MOV     #HHP8,@#$TMP4
6485  032502  012737  033232  001246                MOV     #HHDAT0,@#$TMP5
6486  032510  104002                              1$: MOV     #HHP7,@#$TMP6
6487  032512  000137  033302                        ERROR   2
6488  032516                                        JMP     @#HHDONE
6489  032516  010537  001252                HHER5:
6490  032522  010437  001254                        MOV     R5,@#$TMP10
6491  032526  012737  033252  001240                MOV     R4,@#$TMP11
6492  032534  012737  033242  001242                MOV     #HHP9,@#$TMP3
6493  032542  012737  033132  001244                MOV     #HHP8,@#$TMP4
6494  032550  012737  033232  001246                MOV     #HHDAT0,@#$TMP5
6495  032556  104002                              1$: MOV     #HHP7,@#$TMP6
6496  032560  000137  033302                        ERROR   2
6497  032564                                        JMP     @#HHDONE
6498  032564  010537  001252                HHER6:
6499  032570  010437  001254                        MOV     R5,@#$TMP10
6500  032574  012737  033252  001240                MOV     R4,@#$TMP11
6501  032602  012737  033242  001242                MOV     #HHP9,@#$TMP3
6502  032610  012737  033132  001244                MOV     #HHP8,@#$TMP4
6503  032616  012737  033232  001246                MOV     #HHDAT0,@#$TMP5
6504  032624  104002                              1$: MOV     #HHP7,@#$TMP6
6505  032626  000137  033302                        ERROR   2
6506  032632                                        JMP     @#HHDONE
6507  032632  010537  001252                HHER7:
6508  032636  010437  001254                        MOV     R5,@#$TMP10
6509  032642  012737  033242  001240                MOV     R4,@#$TMP11
6510  032650  012737  033242  001242                MOV     #HHP8,@#$TMP3
6511  032656  012737  033132  001244                MOV     #HHP8,@#$TMP4
6512  032664  012737  033262  001246                MOV     #HHDAT0,@#$TMP5
6513  032672  104002                              1$: MOV     #HHP10,@#$TMP6
6514  032674  000137  033302                        ERROR   2
6515  032700                                        JMP     @#HHDONE
6516  032700  010537  001252                HHER8:
6517  032704  010437  001254                        MOV     R5,@#$TMP10
6518  032710  012737  033242  001240                MOV     R4,@#$TMP11
6519  032716  012737  033242  001242                MOV     #HHP8,@#$TMP3
6520  032724  012737  033132  001244                MOV     #HHP8,@#$TMP4
6521  032732  012737  033262  001246                MOV     #HHDAT0,@#$TMP5
6522  032740  104002                              1$: MOV     #HHP10,@#$TMP6
6523  032742  000137  033302                        ERROR   2
6524  032746                                        JMP     @#HHDONE
6525  032746  010537  001252                HHER9:
6526  032752  010437  001254                        MOV     R5,@#$TMP10
6527  032756  012737  033212  001240                MOV     R4,@#$TMP11
6528  032764  012737  033212  001242                MOV     #HHP5,@#$TMP3
6529  032772  012737  033132  001244                MOV     #HHP5,@#$TMP4
6530  033000  012737  033272  001246                MOV     #HHDAT0,@#$TMP5
6531  033006  104002                              1$: MOV     #HHP11,@#$TMP6
6532  033010  000137  033302                        ERROR   2
6533  033014                                        JMP     @#HHDONE
6534  033014  010537  001252                HHER10:
                                                    MOV     R5,@#$TMP10
```

```
6535  033020  010437  001254                MOV     R4,@#$TMP11
6536  033024  012737  033212  001240        MOV     #HHP5,@#$TMP3
6537  033032  012737  033212  001242        MOV     #HHP5,@#$TMP4
6538  033040  012737  033132  001244        MOV     #HHDATO,@#$TMP5
6539  033046  012737  033272  001246        MOV     #HHP11,@#$TMP6
6540  033054  104002                1$:     ERROR   2
6541  033056  000137  033302                JMP     @#HHDONE
6542  033062  013703  001236        HHTRAP: MOV     @#$TMP2,R3      ;WAS THE TRAP TO 244
6543  033066  062703  000002                ADD     #2,R3           ;ON THE INSTRUCTION
6544  033072  020316                        CMP     R3,(SP)         ;BEING TESTED?
6545  033074  001402                        BEQ     1$
6546  033076  000137  062534                JMP     @#FPSPUR
6547  033102  011637  001236        1$:     MOV     (SP),@#$TMP2    ;FAILURE OF FPS INTERRUPT
6548                                                                ;DISABLE BIT (FID=1)
6549  033106  022626                        CMP     (SP)+,(SP)+     ;TO INHIBIT TRAP.
6550  033110  170201                        STFPS   R1
6551  033112  010137  001240                MOV     R1,@#$TMP3
6552  033116  170301                        STST    R1
6553  033120  010137  001242                MOV     R1,@#$TMP4
6554  033124  104002                2$:     ERROR   2
6555  033126  000137  033302                JMP     @#HHDONE
6556  033132  000000        HHDATO: 0
6557  033134  000000                0
6558  033136  000000                0
6559  033140  000000                0
6560  033142  000452        HHP0:   452
6561  033144  125252                125252
6562  033146  125252                125252
6563  033150  125253                125253
6564  033152  000252        HHP1:   252
6565  033154  125252                125252
6566  033156  125252                125252
6567  033160  125252                125252
6568  033162  000600        HHP2:   600             ;HHP0 + HHP1 WITH
6569  033164  000000                0               ;PROPER NORMALIZATION
6570  033166  000000                0
6571  033170  000000                0
6572  033172  000400        HHP3:   400             ;HHP0 + HHP1 WITH
6573  033174  000000                0               ;BAD NORMALIZATION
6574  033176  000000                0
6575  033200  000000                0
6576  033202  000000        HHP4:   0
6577  033204  000000                0
6578  033206  000000                0
6579  033210  000000                0
6580  033212  100200        HHP5:   100200
6581  033214  000000                0
6582  033216  000000                0
6583  033220  000000                0
6584  033222  000300        HHP6:   300
6585  033224  000000                0
6586  033226  000000                0
6587  033230  000000                0
6588  033232  100000        HHP7:   100000          ;HHP7 = HHP8 + HHP9
6589  033234  000000                0               ;      = HHP5 + HHP6
6590  033236  000000                0
```

```
 6591  033240  000000                          0
 6592  033242  000200                HHP8:     200
 6593  033244  000000                          0
 6594  033246  000000                          0
 6595  033250  000000                          0
 6596  033252  100300                HHP9:     100300
 6597  033254  000000                          0
 6598  033256  000000                          0
 6599  033260  000000                          0
 6600  033262  000400                HHP10:    400                     ;HHP10 = HHP8 + HHP8
 6601  033264  000000                          0
 6602  033266  000000                          0
 6603  033270  000000                          0
 6604  033272  100400                HHP11:    100400                  ;HHP11 = HHP5 + HHP5
 6605  033274  000000                          0
 6606  033276  000000                          0
 6607  033300  000000                          0
 6608  033302                        HHDONE:
 6609  033302  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 6610                                                                  ;SEE IF THE USER HAS EXPRESSED
 6611                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 6612                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 6613                                                                  ;THE USER TYPED CONTROL G?).
 6614
 6615
 6616                                ;;*****************************************************************
 6617                                ;*TEST 40       OVER\UNDER TEST
 6618                                ;*
 6619                                ;*THIS IS A PARTIAL TEST OF THE OVER\UNDER
 6620                                ;*FLOWS.  ONE OVERFLOW AND TWO UNDERFLOW
 6621                                ;*CONDITIONS ARE CHECKED.  THE REMAINING
 6622                                ;*UNDERFLOW COND. AND THE REMAINING OVERFLOW
 6623                                ;*COND. WILL BE CHECKED LATER USING THE
 6624                                ;*XXX INSTRUCTION.  HERE EACH CONDITION TESTED
 6625                                ;*IS CHECKED BOTH WITH TRAPS ENABLED
 6626                                ;*(FIU=1 OR FIV=1) AND ALSO WITH TRAPS
 6627                                ;*DISABLED (FIU=0 OR FIV=0).
 6628                                ;*
 6629                                ;;*****************************************************************
 6630  033304  000004                TST40:  SCOPE
 6631
 6632                                ;TEST OVERFLOW CONDITION WITH TRAP DISABLER FIV=0
 6633  033306                        GG1:
 6634  033306  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 6635  033310  012704  000200                  MOV     #200,R4         ;CLEAR FIU, FIV, AND SET FD
 6636  033314  170104                          LDFPS   R4
 6637  033316  012737  033344  001236          MOV     #GG2,@#$TMP2
 6638  033324  012737  034376  000244          MOV     #GGER0,@#FPVECT
 6639  033332  012700  036150                  MOV     #GGP5,R0        ;SET AC0 OPERAND
 6640  033336  172410                          LDD     (R0),AC0
 6641  033340  012700  036150                  MOV     #GGP5,R0        ;FSRC
 6642  033344  172010                GG2:      ADDD    (R0),AC0        ;TEST INSTRUCTION
 6643  033346  170205                          STFPS   R5              ;GET FPS
 6644  033350  012700  036100                  MOV     #GGDAT0,R0      ;GET THE RESULT
 6645  033354  174010                          STD     AC0,(R0)
 6646  033356  012701  036160                  MOV     #GGP6,R1        ;IS IT CORRECT
```

```
6647  033362  012702  000004            MOV     #4,R2
6648  033366  022021                GG3:  CMP     (R0)+,(R1)+
6649  033370  001402                      BEQ     GG4
6650  033372  000137  034474            JMP     @#GGER1
6651  033376  077205                GG4:  SOB     R2,GG3
6652  033400  052704  000006            BIS     #6,R4           ;FPS CORRECT?
6653  033404  020405                      CMP     R4,R5
6654  033406  001402                      BEQ     GG5
6655  033410  000137  034542            JMP     @#GGER2
6656                                    ;TEST OVERFLOW WITH TRAPS ENABLED
6657                                    ;FIV = 1
6658  033414                        GG5:
6659  033414  104414                      LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6660  033416  012704  001200            MOV     #1200,R4        ;CLEAR FIU, SET FIV, AND FD
6661  033422  170104                      LDFPS   R4
6662  033424  012737  033452  001236      MOV     #GG6,@#$TMP2
6663  033432  012737  033470  000244      MOV     #GG7,@#FPVECT
6664  033440  012700  036150            MOV     #GGP5,R0        ;SET AC0 OPERAND
6665  033444  172410                      LDD     (R0),AC0
6666  033446  012700  036150            MOV     #GGP5,R0        ;FSPC
6667  033452  172010                GG6:  ADDD    (R0),AC0        ;TEST INSTRUCTION
6668  033454  170000                      CFCC                    ;NO OVERFLOW TRAP OCCURED
6669  033456  012700  036100            MOV     #GGDAT0,R0
6670  033462  174010                      STD     AC0,(R0)
6671  033464  000137  034610            JMP     @#GGER3
6672  033470  013703  001236        GG7:  MOV     @#$TMP2,R3
6673  033474  062703  000002            ADD     #2,R3
6674  033500  020316                      CMP     R3,(SP)         ;CHECK STACK DATA
6675  033502  001402                      BEQ     1$
6676  033504  000137  062534            JMP     @#FPSPUR
6677  033510  011637  001236        1$:   MOV     (SP),@#$TMP2
6678  033514  022626                      CMP     (SP)+,(SP)+
6679  033516  170205                      STFPS   R5
6680  033520  012700  036100            MOV     #GGDAT0,R0      ;GET THE RESULT
6681  033524  174010                      STD     AC0,(R0)
6682  033526  012701  036160            MOV     #GGP6,R1        ;IS IT CORRECT
6683  033532  012702  000004            MOV     #4,R2
6684  033536  022021                GG8:  CMP     (R0)+,(R1)+
6685  033540  001402                      BEQ     GG9
6686  033542  000137  034656            JMP     @#GGER4
6687  033546  077205                GG9:  SOB     R2,GG8
6688  033550  052704  100006            BIS     #100006,R4      ;EXACT ZERO RESULTED IF OVERFLOW
6689  033554  020405                      CMP     R4,R5           ;FPS CORRECT?, CHECK FER, FZ, FV
6690  033556  001402                      BEQ     1$
6691  033560  000137  034726            JMP     @#GGER6
6692  033564  012704  000010        1$:   MOV     #10,R4
6693                                ;CHECK FEC
6694  033570  170305                      STST    R5
6695  033572  020405                      CMP     R4,R5
6696  033574  001402                      BEQ     GG10
6697  033576  000137  034660            JMP     @#GGER5
6698                                ;CHECK UNDER FLOW CONDITION WITH
6699                                ;TRAPS DISABLED (FIU = 0)
6700  033602                        GG10:
6701  033602  104414                      LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6702  033604  012704  000200            MOV     #0200,R4        ;SET FIU, FIV, AND FD
```

```
6703  033610  170104                          LDFPS   R4
6704  033612  012737  033640  001236          MOV     #GG11,@#$TMP2
6705  033620  012737  034774  000244          MOV     #GGER7,@#FPVECT
6706  033626  012700  036120                  MOV     #GGP2,R0        ;SET AC0 OPERAND
6707  033632  172410                          LDD     (R0),AC0        ;FSRC
6708  033634  012700  036130                  MOV     #GGP3,R0
6709  033640  172010                  GG11:   ADDD    (R0),AC0        ;TEST INSTRUCTION
6710  033642  170205                          STFPS   R5              ;GET FPS
6711  033644  012700  036100                  MOV     #GGDAT0,R0      ;GET THE RESULT
6712  033650  174010                          STD     AC0,(R0)
6713  033652  012701  036160                  MOV     #GGP6,R1        ;IS IT CORRECT
6714  033656  012702  000004                  MOV     #4,R2
6715  033662  022021                  GG12:   CMP     (R0)+,(R1)+
6716  033664  001402                          BEQ     GG13
6717  033666  000137  035072                  JMP     @#GGER8
6718  033672  077205                  GG13:   SOB     R2,GG12
6719  033674  052704  000004                  BIS     #4,R4           ;FPS CORRECT?
6720  033700  020405                          CMP     R4,R5
6721  033702  001402                          BEQ     GG14
6722  033704  000137  035140                  JMP     @#GGER9
6723                                          ;CHECK UNDERFLOW CONDITION WITH
6724                                          ;TRAP ENABLED (FIU = 1)
6725  033710                          GG14:
6726  033710  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6727  033712  012704  002200                  MOV     #2200,R4        ;SET FIU, FIV, AND FD
6728  033716  170104                          LDFPS   R4
6729  033720  012737  033746  001236          MOV     #GG15,@#$TMP2
6730  033726  012737  033764  000244          MOV     #GG16,@#FPVECT
6731  033734  012700  036120                  MOV     #GGP2,R0        ;SET AC0 OPERAND
6732  033740  172410                          LDD     (R0),AC0        ;FSRC
6733  033742  012700  036130                  MOV     #GGP3,R0
6734  033746  172010                  GG15:   ADDD    (R0),AC0        ;TEST INSTRUCTION
6735  033750  170000                          CFCC
6736  033752  012700  036100                  MOV     #GGDAT0,R0
6737  033756  174010                          STD     AC0,(R0)
6738  033760  000137  035206                  JMP     @#GGER10
6739  033764  013703  001236          GG16:   MOV     @#$TMP2,R3
6740  033770  062703  000002                  ADD     #2,R3
6741  033774  021603                          CMP     (SP),R3
6742  033776  001402                          BEQ     1$
6743  034000  000137  062534                  JMP     @#FPSPUR
6744  034004  011637  001236          1$:     MOV     (SP),@#$TMP2
6745  034010  022626                          CMP     (SP)+,(SP)+
6746  034012  170205                          STFPS   R5              ;GET FPS
6747  034014  012700  036100                  MOV     #GGDAT0,R0      ;GET THE RESULT
6748  034020  174010                          STD     AC0,(R0)
6749  034022  012701  036170                  MOV     #GGP7,R1        ;IS IT CORRECT
6750  034026  012702  000004                  MOV     #4,R2
6751  034032  022021                  GG17:   CMP     (R0)+,(R1)+
6752  034034  001402                          BEQ     GG18
6753  034036  000137  035254                  JMP     @#GGER11
6754  034042  077205                  GG18:   SOB     R2,GG17
6755  034044  052704  100000                  BIS     #100000,R4
6756  034050  020405                          CMP     R4,R5           ;FPS CORRECT?
6757  034052  001402                          BEQ     2$
6758  034054  000137  035322                  JMP     @#GGER12
```

```
 6759  034060                                  2$:
 6760  034060  012704  000012                  1$:     MOV     #12,R4
 6761                                          ;CHECK FEC
 6762  034064  170305                                  STST    R5
 6763  034066  020405                                  CMP     R4,R5
 6764  034070  001402                                  BEQ     GG19
 6765  034072  000177  001272                          JMP     @GGER13
 6766                                          ;CHECK UNDERFLOW CONDITION WITH TRAPS
 6767                                          ;DISABLED (FIU = 0)
 6768  034076                                  GG19:
 6769  034076  104414                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 6770  034100  012704  000200                          MOV     #0200,R4        ;SET FIU, FIV, AND FD
 6771  034104  170104                                  LDFPS   R4
 6772  034106  012737  034134  001236                  MOV     #GG20,@#$TMP2
 6773  034114  012737  035436  000244                  MOV     #GGER14,@#FPVECT
 6774  034122  012700  036120                          MOV     #GGP2,R0        ;SET AC0 OPERAND
 6775  034126  172410                                  LDD     (R0),AC0
 6776  034130  012700  036200                          MOV     #GGP8,R0        ;FSPC
 6777  034134  172010                          GG20:   ADDD    (R0),AC0        ;TEST INSTRUCTION
 6778  034136  170205                                  STFPS   R5              ;GET FPS
 6779  034140  012700  036100                          MOV     #GGDAT0,R0      ;GET THE RESULT
 6780  034144  174010                                  STD     AC0,(R0)
 6781  034146  012701  036160                          MOV     #GGP6,R1        ;IS IT CORRECT
 6782  034152  012702  000004                          MOV     #4,R2
 6783  034156  022021                          GG21:   CMP     (R0)+,(R1)+
 6784  034160  001402                                  BEQ     GG22
 6785  034162  000137  035534                          JMP     @#GGER15
 6786  034166  077205                          GG22:   SOB     R2,GG21
 6787  034170  052704  000004                          BIS     #4,R4           ;FPS CORRECT?
 6788  034174  020405                                  CMP     R4,R5
 6789  034176  001402                                  BEQ     GG23
 6790  034200  000137  035602                          JMP     @#GGER16
 6791                                          ;CHECK UNDERFLOW CONDITION WITH TRAP
 6792                                          ;ENABLED (FIU = 1)
 6793  034204                                  GG23.
 6794  034204  104414                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 6795  034206  012704  002200                          MOV     #2200,R4        ;SET FIU, FIV, AND FD
 6796  034212  170104                                  LDFPS   R4
 6797  034214  012737  034242  001236                  MOV     #GG24,@#$TMP2
 6798  034222  012737  034260  000244                  MOV     #GG25,@#FPVECT
 6799  034230  012700  036120                          MOV     #GGP2,R0        ;SET AC0 OPERAND
 6800  034234  172410                                  LDD     (R0),AC0
 6801  034236  012700  036200                          MOV     #GGP8,R0        ;FSRC
 6802  034242  172010                          GG24:   ADDD    (R0),AC0        ;TEST INSTRUCTION
 6803  034244  170000                                  CFCC
 6804  034246  012700  036100                          MOV     #GGDAT0,R0
 6805  034252  174010                                  STD     AC0,(R0)
 6806  034254  000137  035650                          JMP     @#GGER17
 6807  034260  013700  001236                  GG25:   MOV     @#$TMP2,R0
 6808  034264  062700  000002                          ADD     #2,R0
 6809  034270  020016                                  CMP     R0,(SP)
 6810  034272  001402                                  BEQ     1$
 6811  034274  000137  062534                          JMP     @#FPSPUR
 6812  034300  011637  001236                  1$:     MOV     (SP),@#$TMP2
 6813  034304  022626                                  CMP     (SP)+,(SP)+
 6814  034306  170205                                  STFPS   R5              ;GET FPS
```

```
6815  034310  012700  036100            MOV     #GGDATO,R0      ;GET THE RESULT
6816  034314  174010                    STD     AC0,(R0)
6817  034316  012701  036210            MOV     #GGP9,R1        ;IS IT CORRECT
6818  034322  012702  000004            MOV     #4,R2
6819  034326  022021            GG26:   CMP     (R0)+,(R1)+
6820  034330  001402                    BEQ     GG27
6821  034332  000137  035716            JMP     @#GGER18
6822  034336  077205            GG27:   SOB     R2,GG26
6823  034340  052704  100004            BIS     #100004,R4
6824  034344  020405                    CMP     R4,R5           ;FPS CORRECT?
6825  034346  001402                    BEQ     1$
6826  034350  000167  001456            JMP     GGER20
6827  034354  012704  000012    1$:     MOV     #12,R4
6828                            ;CHECK FEC
6829  034360  170305                    STST    R5
6830  034362  020405                    CMP     R4,R5
6831  034364  001402                    BEQ     GG28
6832  034366  000167  001372            JMP     GGER19
6833
6834  034372  000137  036220    GG28:   JMP     @#GGDONE
6835
6836  034376  013701  001236    GGER0:  MOV     @#$TMP2,R1
6837  034402  062701  000002            ADD     #2,R1
6838  034406  020116                    CMP     R1,(SP)
6839  034410  001402                    BEQ     10$
6840  034412  000137  062534    5$:     JMP     @#FPSPUR
6841  034416                    10$:
6842  034416  170301                    STST    R1
6843  034420  020127  000010            CMP     R1,#10
6844  034424  001372                    BNE     5$
6845  034426  022626                    CMP     (SP)+,(SP)+
6846  034430  012700  036100            MOV     #GGDATO,R0
6847  034434  174010                    STD     AC0,(R0)
6848  034436  012737  036150  001240    MOV     #GGP5,@#$TMP3
6849  034444  012737  036150  001242    MOV     #GGP5,@#$TMP4
6850  034452  012737  036100  001244    MOV     #GGDATO,@#$TMP5
6851  034460  012737  036160  001246    MOV     #GGP6,@#$TMP6
6852  034466  104001            1$:     ERROR   1
6853  034470  000137  036220            JMP     @#GGDONE
6854
6855  034474            GGER1:
6856  034474  010537  001252            MOV     R5,@#$TMP10
6857  034500  010437  001254            MOV     R4,@#$TMP11
6858  034504  012737  036150  001240    MOV     #GGP5,@#$TMP3
6859  034512  012737  036150  001242    MOV     #GGP5,@#$TMP4
6860  034520  012737  036100  001244    MOV     #GGDATO,@#$TMP5
6861  034526  012737  036160  001246    MOV     #GGP6,@#$TMP6
6862  034534  104002            1$:     ERROR   2
6863  034536  000137  036220            JMP     @#GGDONE
6864
6865  034542            GGER2:
6866  034542  010537  001252            MOV     R5,@#$TMP10
6867  034546  010437  001254            MOV     R4,@#$TMP11
6868  034552  012737  036150  001240    MOV     #GGP5,@#$TMP3
6869  034560  012737  036150  001242    MOV     #GGP5,@#$TMP4
6870  034566  012737  036100  001244    MOV     #GGDATO,@#$TMP5
```

```
 6871  034574  012737  036160  001246          MOV     #GGP6,@#$TMP6
 6872  034602  104002                  1$:     ERROR   2
 6873  034604  000137  036220                  JMP     @#GGDONE
 6874
 6875  034610                          GGER3:
 6876  034610  010537  001252                  MOV     R5,@#$TMP10
 6877  034614  010437  001254                  MOV     R4,@#$TMP11
 6878  034620  012737  036150  001240          MOV     #GGP5,@#$TMP3
 6879  034626  012737  036150  001242          MOV     #GGP5,@#$TMP4
 6880  034634  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6881  034642  012737  036160  001246          MOV     #GGP6,@#$TMP6
 6882  034650  104002                  1$:     ERROR   2
 6883  034652  000137  036220                  JMP     @#GGDONE
 6884
 6885  034656  000706                  GGER4:  BR      GGER1
 6886
 6887  034660                          GGER5:
 6888  034660  010537  001252                  MOV     R5,@#$TMP10
 6889  034664  010437  001254                  MOV     R4,@#$TMP11
 6890  034670  012737  036150  001240          MOV     #GGP5,@#$TMP3
 6891  034676  012737  036150  001242          MOV     #GGP5,@#$TMP4
 6892  034704  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6893  034712  012737  036160  001246          MOV     #GGP6,@#$TMP6
 6894  034720  104002                  1$:     ERROR   2
 6895  034722  000137  036220                  JMP     @#GGDONE
 6896
 6897  034726                          GGER6:
 6898  034726  010537  001252                  MOV     R5,@#$TMP10
 6899  034732  010437  001254                  MOV     R4,@#$TMP11
 6900  034736  012737  036150  001240          MOV     #GGP5,@#$TMP3
 6901  034744  012737  036150  001242          MOV     #GGP5,@#$TMP4
 6902  034752  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6903  034760  012737  036160  001246          MOV     #GGP6,@#$TMP6
 6904  034766  104002                  1$:     ERROR   2
 6905  034770  000137  036220                  JMP     @#GGDONE
 6906
 6907  034774  013701  001236          GGER7:  MOV     @#$TMP2,R1
 6908  035000  062701  000002                  ADD     #2,R1
 6909  035004  020116                          CMP     R1,(SP)
 6910  035006  001402                          BEQ     10$
 6911  035010  000137  062534          5$:     JMP     @#FPSPUR
 6912  035014                          10$:
 6913  035014  170301                          STST    R1
 6914  035016  020127  000012                  CMP     R1,#12
 6915  035022  001372                          BNE     5$
 6916  035024  022626                          CMP     (SP)+,(SP)+
 6917  035026  012700  036100                  MOV     #GGDAT0,R0
 6918  035032  174010                          STD     AC0,(R0)
 6919  035034  012737  036130  001240          MOV     #GGP3,@#$TMP3
 6920  035042  012737  036120  001242          MOV     #GGP2,@#$TMP4
 6921  035050  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6922  035056  012737  036160  001246          MOV     #GGP6,@#$TMP6
 6923  035064  104002                  1$:     ERROR   2
 6924  035066  000137  036220                  JMP     @#GGDONE
 6925
 6926  035072                          GGER8:
```

```
 6927  035072  010537  001252                  MOV     R5,@#$TMP10
 6928  035076  010437  001254                  MOV     R4,@#$TMP11
 6929  035102  012737  036130  001240          MOV     #GGP3,@#$TMP3
 6930  035110  012737  036120  001242          MOV     #GGP2,@#$TMP4
 6931  035116  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6932  035124  012737  036160  001246          MOV     #GGP6,@#$TMP6
 6933  035132  104002                  1$:     ERROR   2
 6934  035134  000137  036220                  JMP     @#GGDONE
 6935
 6936  035140                          GGER9:
 6937  035140  010537  001252                  MOV     R5,@#$TMP10
 6938  035144  010437  001254                  MOV     R4,@#$TMP11
 6939  035150  012737  036130  001240          MOV     #GGP3,@#$TMP3
 6940  035156  012737  036120  001242          MOV     #GGP2,@#$TMP4
 6941  035164  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6942  035172  012737  036160  001246          MOV     #GGP6,@#$TMP6
 6943  035200  104002                  1$:     ERROR   2
 6944  035202  000137  036220                  JMP     @#GGDONE
 6945
 6946  035206                          GGER10:
 6947  035206  010537  001252                  MOV     R5,@#$TMP10
 6948  035212  010437  001254                  MOV     R4,@#$TMP11
 6949  035216  012737  036130  001240          MOV     #GGP3,@#$TMP3
 6950  035224  012737  036120  001242          MOV     #GGP2,@#$TMP4
 6951  035232  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6952  035240  012737  036170  001246          MOV     #GGP7,@#$TMP6
 6953  035246  104002                  1$:     ERROR   2
 6954  035250  000137  036220                  JMP     @#GGDONE
 6955
 6956  035254                          GGER11:
 6957  035254  010537  001252                  MOV     R5,@#$TMP10
 6958  035260  010437  001254                  MOV     R4,@#$TMP11
 6959  035264  012737  036130  001240          MOV     #GGP3,@#$TMP3
 6960  035272  012737  036120  001242          MOV     #GGP2,@#$TMP4
 6961  035300  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6962  035306  012737  036170  001246          MOV     #GGP7,@#$TMP6
 6963  035314  104002                  1$:     ERROR   2
 6964  035316  000137  036220                  JMP     @#GGDONE
 6965
 6966  035322                          GGER12.
 6967  035322  010537  001252                  MOV     R5,@#$TMP10
 6968  035326  010437  001254                  MOV     R4,@#$TMP11
 6969  035332  012737  036130  001240          MOV     #GGP3,@#$TMP3
 6970  035340  012737  036120  001242          MOV     #GGP2,@#$TMP4
 6971  035346  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6972  035354  012737  036170  001246          MOV     #GGP7,@#$TMP6
 6973  035362  104002                  1$:     ERROR   2
 6974  035364  000137  036220                  JMP     @#GGDONE
 6975
 6976  035370                          GGER13:
 6977  035370  010537  001252                  MOV     R5,@#$TMP10
 6978  035374  010437  001254                  MOV     R4,@#$TMP11
 6979  035400  012737  036130  001240          MOV     #GGP3,@#$TMP3
 6980  035406  012737  036120  001242          MOV     #GGP2,@#$TMP4
 6981  035414  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 6982  035422  012737  036170  001246          MOV     #GGP7,@#$TMP6
```

```
 6983  035430  104002                  1$:     ERROR   2
 6984  035432  000137  036220                  JMP     @#GGDONE
 6985
 6986  035436  013701  001236          GGER14: MOV     @#$TMP2,R1
 6987  035442  062701  000002                  ADD     #2,R1
 6988  035446  020116                          CMP     R1,(SP)
 6989  035450  001402                          BEQ     10$
 6990  035452  000137  062534          5$:     JMP     @#FPSPUR
 6991  035456                          10$:
 6992  035456  170301                          STST    R1
 6993  035460  020127  000012                  CMP     R1,#12
 6994  035464  001372                          BNE     5$
 6995  035466  022626                          CMP     (SP)+,(SP)+
 6996  035470  012700  036100                  MOV     #GGDAT0,R0
 6997  035474  174010                          STD     AC0,(R0)
 6998
 6999  035476  012737  036110  001240          MOV     #GGP1,@#$TMP3
 7000  035504  012737  036130  001242          MOV     #GGP3,@#$TMP4
 7001  035512  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 7002  035520  012737  036160  001246          MOV     #GGP6,@#$TMP6
 7003  035526  104002                  1$:     ERROR   2
 7004  035530  000137  036220                  JMP     @#GGDONE
 7005
 7006  035534                          GGER15:
 7007  035534  010537  001252                  MOV     R5,@#$TMP10
 7008  035540  010437  001254                  MOV     R4,@#$TMP11
 7009  035544  012737  036120  001240          MOV     #GGP2,@#$TMP3
 7010  035552  012737  036200  001242          MOV     #GGP8,@#$TMP4
 7011  035560  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 7012  035566  012737  036160  001246          MOV     #GGP6,@#$TMP6
 7013  035574  104002                  1$:     ERROR   2
 7014  035576  000137  036220                  JMP     @#GGDONE
 7015
 7016  035602                          GGER16:
 7017  035602  010537  001252                  MOV     R5,@#$TMP10
 7018  035606  010437  001254                  MOV     R4,@#$TMP11
 7019  035612  012737  036120  001240          MOV     #GGP2,@#$TMP3
 7020  035620  012737  036200  001242          MOV     #GGP8,@#$TMP4
 7021  035626  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 7022  035634  012737  036160  001246          MOV     #GGP6,@#$TMP6
 7023  035642  104002                  1$:     ERROR   2
 7024  035644  000137  036220                  JMP     @#GGDONE
 7025
 7026  035650                          GGER17:
 7027  035650  010537  001252                  MOV     R5,@#$TMP10
 7028  035654  010437  001254                  MOV     R4,@#$TMP11
 7029  035660  012737  036120  001240          MOV     #GGP2,@#$TMP3
 7030  035666  012737  036200  001242          MOV     #GGP8,@#$TMP4
 7031  035674  012737  036100  001244          MOV     #GGDAT0,@#$TMP5
 7032  035702  012737  036210  001246          MOV     #GGP9,@#$TMP6
 7033  035710  104002                  1$:     ERROR   2
 7034  035712  000137  036220                  JMP     @#GGDONE
 7035
 7036  035716                          GGER18:
 7037  035716  010537  001252                  MOV     R5,@#$TMP10
 7038  035722  010437  001254                  MOV     R4,@#$TMP11
```

```
7039  035726  012737  036120  001240          MOV     #GGP2,@#$TMP3
7040  035734  012737  036200  001242          MOV     #GGP8,@#$TMP4
7041  035742  012737  036100  001244          MOV     #GGDATO,@#$TMP5
7042  035750  012737  036210  001246          MOV     #GGP9,@#$TMP6
7043  035756  104002                  1$:     ERROR   2
7044  035760  000137  036220                  JMP     @#GGDONE
7045
7046  035764                          GGER19:
7047  035764  010537  001252                  MOV     R5,@#$TMP10
7048  035770  010437  001254                  MOV     R4,@#$TMP11
7049  035774  012737  036120  001240          MOV     #GGP2,@#$TMP3
7050  036002  012737  036200  001242          MOV     #GGP8,@#$TMP4
7051  036010  012737  036100  001244          MOV     #GGDATO,@#$TMP5
7052  036016  012737  036210  001246          MOV     #GGP9,@#$TMP6
7053  036024  104002                  1$:     ERROR   2
7054  036026  000137  036220                  JMP     @#GGDONE
7055
7056  036032                          GGER20:
7057  036032  010537  001252                  MOV     R5,@#$TMP10
7058  036036  010437  001254                  MOV     R4,@#$TMP11
7059  036042  012737  036120  001240          MOV     #GGP2,@#$TMP3
7060  036050  012737  036200  001242          MOV     #GGP8,@#$TMP4
7061  036056  012737  036100  001244          MOV     #GGDATO,@#$TMP5
7062  036064  012737  036210  001246          MOV     #GGP9,@#$TMP6
7063  036072  104002                  1$:     ERROR   2
7064  036074  000137  036220                  JMP     @#GGDONE
7065
7066  036100  000000                  GGDATO: 0
7067  036102  000000                          0
7068  036104  000000                          0
7069  036106  000000                          0
7070
7071  036110  000300                  GGP1:   300
7072  036112  000000                          0
7073  036114  000000                          0
7074  036116  000000                          0
7075  036120  100200                  GGP2:   100200
7076  036122  000000                          0
7077  036124  000000                          0
7078  036126  000000                          0
7079  036130  000200                  GGP3:   200
7080  036132  000000                          0
7081  036134  000000                          0
7082  036136  000001                          1
7083  036140  010200                  GGP4:   10200
7084  036142  000000                          0
7085  036144  000000                          0
7086  036146  000000                          0
7087  036150  077600                  GGP5:   77600           ;OVER FLOW = GGP5 + GGP5
7088  036152  000000                          0
7089  036154  000000                          0
7090  036156  000000                          0
7091  036160  000000                  GGP6:   0               ;OVERFLOW RESULT
7092  036162  000000                          0               ;UNDERFLOW RESULT
7093  036164  000000                          0               ;GGP6 = GGP4 + GGP5
7094  036166  000000                          0               ;     = GGP3 + GGP2 (FIU = 0)
```

```
 7095
 7096  036170  062400                GGP7:   62400                   ;       = GGP3 + GGP1
 7097  036172  000000                        0                       ;GGP7 = GGP3 + GGP2 (FIU = 1)
 7098  036174  000000                        0
 7099  036176  000000                        0
 7100  036200  000340                GGP8:   340
 7101  036202  000000                        0
 7102  036204  000000                        0
 7103  036206  000000                        0
 7104  036210  000100                GGP9:   100
 7105  036212  000000                        0
 7106  036214  000000                        0
 7107  036216  000000                        0
 7108  036220                        GGDONE:
 7109  036220  104413                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 7110                                                                ;SEE IF THE USER HAS EXPRESSED
 7111                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
 7112                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 7113                                                                ;THE USER TYPED CONTROL G?).
 7114
 7115
 7116                                ;;******************************************************************
 7117                                ;*TEST 41       LDCFD AND LDCDF TEST
 7118                                ;*
 7119                                ;*THIS IS A TEST OF LDCFD AND LDCDF.
 7120                                ;*
 7121                                ;;******************************************************************
 7122  036222  000004                TST41:  SCOPE
 7123                                ;TEST FOR CORRECT AUTO INCREMENT CONSTANT.
 7124  036224                        HX1:
 7125  036224  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 7126  036226  012704  000200                MOV     #200,R4         ;SET LONG INTEGER MODE
 7127  036232  170104                        LDFPS   R4
 7128  036234  012700  037640                MOV     #HXP1,R0
 7129  036240  172410                        LDD     (R0),AC0
 7130  036242  012700  037650                MOV     #HXP2,R0
 7131  036246  012737  036254  001236        MOV     #HX2,@#$TMP2
 7132  036254  177420                HX2:    LDCFD   (R0)+,AC0
 7133  036256  020027  037654                CMP     R0,#HXP2+4      ;IS R0 CORRECT
 7134  036262  001402                        BEQ     HX3
 7135  036264  000137  037216                JMP     @#HXER1
 7136  036270                        HX3:
 7137  036270  170205                        STFPS   R5              ;GET FPS
 7138  036272  012700  037630                MOV     #HXDAT0,R0
 7139  036276  174010                        STD     AC0,(R0)        ;GET AC0
 7140  036300  012701  037720                MOV     #HXP7,R1        ;SEE IF RESULT IS
 7141  036304  012702  000004                MOV     #4,R2           ;CORRECT
 7142  036310  022120                HX4:    CMP     (R1)+,(R0)+
 7143  036312  001415                        BEQ     HX7
 7144  036314  012701  037650                MOV     #HXP2,R1        ;DID FD GET
 7145  036320  012700  037630                MOV     #HXDAT0,R0      ;COMPLIMENTED?
 7146  036324  012702  000004                MOV     #4,R2
 7147  036330  022120                HX5:    CMP     (R1)+,(R0)+
 7148  036332  001402                        BEQ     HX6
 7149  036334  000137  037256                JMP     @#HXER2
 7150  036340  077205                HX6:    SOB     R2,HX5
```

```
7151  036342  000137  037306                  JMP     @#HXER3
7152  036346  077220                  HX7:    SOB     R2,HX4
7153  036350  012704  000200                  MOV     #200,R4         ;FPS CORRECT?
7154  036354  020405                          CMP     R4,R5
7155  036356  001402                          BEQ     HX8
7156  036360  000137  037354                  JMP     @#HXER8
7157                                  ;NOW    TEST    LDCDF
7158  036364                          HX8:
7159  036364  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7160  036366  012704  000200                  MOV #200,R4
7161  036372  170104                          LDFPS R4
7162
7163  036374  012700  037640                  MOV     #HXP1,R0
7164  036400  172410                          LDD     (R0),AC0
7165
7166  036402  012700  037650                  MOV     #HXP2,R0
7167  036406  012737  036416  001236          MOV     #HX9,@#$TMP2
7168
7169  036414  170001                          SETF
7170
7171  036416  177420                  HX9:    LDCDF   (R0)+,AC0       ;TEST INSTRUCTION
7172
7173  036420  020027  037660                  CMP     R0,#HXP2+10     ;WAS A GOOD
7174  036424  001402                          BEQ     HX10            ;CONSTANT USED
7175  036426  000137  037236                  JMP     @#HXER5         ;TO INCREMENT R0?
7176
7177  036432                          HX10:
7178  036432  170205                          STFPS   R5
7179  036434  012700  037630                  MOV     #HXDAT0,R0
7180  036440  170011                          SETD
7181  036442  174010                          STD     AC0,(R0)        ;GET RESULT
7182  036444  012701  037730                  MOV     #HXP8,R1
7183  036450  012702  000004                  MOV     #4,R2
7184  036454  022120                  HX11:   CMP     (R1)+,(R0)+     ;IS IT CORRECT?
7185  036456  001415                          BEQ     HX14
7186
7187  036460  012701  037720                  MOV     #HXP7,R1
7188  036464  012700  037630                  MOV     #HXDAT0,R0
7189  036470  012702  000004                  MOV     #4,R2
7190  036474  022110                  HX12:   CMP     (R1)+,(R0)      ;DID FD FAIL TO GET
7191  036476  001402                          BEQ     HX13            ;COMPLIMENTED?
7192  036500  000137  037372                  JMP     @#HXER6
7193  036504  077205                  HX13:   SOB     R2,HX12
7194  036506  000137  037422                  JMP     @#HXER7
7195
7196  036512  077220                  HX14:   SOB     R2,HX11
7197
7198  036514  012704  000000                  MOV     #0,R4           ;FPS CORRECT?
7199  036520  020405                          CMP     R4,R5
7200  036522  001402                          BEQ     HX15
7201  036524  000137  037354                  JMP     @#HXER8
7202
7203                                  ;TEST GR7 IMMEDIATE MODE CONSTANT
7204
7205  036530                          HX15:
7206  036530  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
```

```
7207
7208  036532  012704  000200                  MOV     #200,R4
7209  036536  170104                          LDFPS   R4                      ;SET FD
7210  036540  012737  036556  001236          MOV     #HX16,@#$TMP2
7211  036546  012737  037452  000004          MOV     #HXER9,@#ERRVECT
7212  036554  005001                          CLR     R1
7213  036556  177427  043243          HX16:   LDCFD   #5201,AC0
7214  036562  005201                  HX165:  INC     R1
7215  036564  005201                          INC     R1
7216  036566  005201                          INC     R1
7217  036570  012737  062566  000004          MOV     #CPSPUR,@#ERRVECT
7218  036576  020127  000003                  CMP     R1,#3                   ;SEE IF PC WAS
7219  036602  001402                          BEQ     HX17                    ;CORRECT
7220  036604  000137  037506                  JMP     @#HXER10
7221
7222  036610                          HX17:
7223  036610  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
7224
7225  036612  012704  000200                  MOV     #200,R4
7226  036616  170104                          LDFPS   R4
7227  036620  012737  036646  001236          MOV     #HX18,@#$TMP2
7228  036626  012700  037710                  MOV     #HXP6,R0
7229  036632  172410                          LDD     (R0),AC0
7230  036634  012737  062566  000004          MOV     #CPSPUR,@#ERRVECT
7231  036642  012700  037650                  MOV     #HXP2,R0
7232  036646  177410                  HX18:   LDCFD   (R0),AC0
7233
7234  036650  012700  037630                  MOV     #HXDAT0,R0
7235  036654  174010                          STD     AC0,(R0)                ;GET RESULT.
7236  036656  012701  037720                  MOV     #HXP7,R1
7237  036662  012702  000004                  MOV     #4,R2
7238  036666  022021                  HX19:   CMP     (R0)+,(R1)+             ;IS RESULT CORRECT?
7239  036670  001402                          BEQ     HX20
7240  036672  000137  037256                  JMP     @#HXER2
7241  036676  077205                  HX20:   SOB     R2,HX19
7242
7243                                  ;TEST LDCFD WITH NEGATIVE OPERAND
7244  036700                          HX21:
7245  036700  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
7246  036702  012704  000200                  MOV     #200,R4
7247  036706  170104                          LDFPS   R4
7248  036710  012737  036730  001236          MOV     #HX22,@#$TMP2
7249  036716  012700  037710                  MOV     #HXP6,R0
7250  036722  172410                          LDD     (R0),AC0
7251  036724  012700  037670                  MOV     #HXP4,R0
7252  036730  177410                  HX22:   LDCFD   (R0),AC0
7253
7254  036732  012700  037630                  MOV     #HXDAT0,R0
7255  036736  174010                          STD     AC0,(R0)                ;GET RESULT
7256
7257  036740  012701  037700                  MOV     #HXP5,R1
7258  036744  012702  000004                  MOV     #4,R2
7259  036750  022120                  HX23:   CMP     (R1)+,(R0)+
7260  036752  001415                          BEQ     HX26
7261
7262  036754  012701  037720                  MOV     #HXP7,R1
```

```
7263  036760  012700  037630          MOV     #HXDAT0,R0
7264  036764  012702  000004          MOV     #4,R2
7265  036770  022120          HX24:   CMP     (R1)+,(R0)+     ;WAS SIGN INCORRECT
7266  036772  001402                  BEQ     HX25
7267  036774  000137  037540          JMP     @#HXER11
7268  037000  077205          HX25:   SOB     R2,HX24
7269  037002  000137  037560          JMP     @#HXER12
7270
7271  037006  077220          HX26:   SOB     R2,HX23
7272
7273                          ;TEST   LDCFD   0
7274
7275  037010                  HX27:
7276  037010  104414                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7277  037012  012704  000200          MOV     #200,R4
7278  037016  170104                  LDFPS   R4
7279
7280  037020  012700  037640          MOV     #HXP1,R0
7281  037024  172410                  LDD     (R0),AC0
7282  037026  172010                  ADDD    (R0),AC0
7283
7284  037030  012737  037042  001236  MOV     #HX28,@#$TMP2
7285  037036  012700  037640          MOV     #HXP1,R0
7286  037042  177410          HX28:   LDCFD   (R0),AC0
7287
7288  037044  170205                  STFPS   R5
7289
7290  037046  012700  037630          MOV     #HXDAT0,R0
7291  037052  174010                  STD     AC0,(R0)        ;GET RESULT
7292
7293  037054  012701  037640          MOV     #HXP1,R1
7294  037060  012702  000004          MOV     #4,R2
7295  037064  022120          HX29:   CMP     (R1)+,(R0)+     ;IS IT 0?
7296  037066  001402                  BEQ     HX30
7297  037070  000137  037610          JMP     @#HXER13
7298  037074  077205          HX30:   SOB     R2,HX29
7299
7300  037076  012704  000204          MOV     #204,R4         ;FPS CORRECT
7301  037102  020405                  CMP     R4,R5
7302  037104  001402                  BEQ     HX31
7303  037106  000137  037336          JMP     @#HXER4
7304
7305                          ;TEST   LDCFD   0
7306
7307  037112                  HX31:
7308  037112  104414                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7309  037114  012704  000200          MOV     #200,R4
7310  037120  170104                  LDFPS   R4
7311
7312  037122  012700  037710          MOV     #HXP6,R0
7313  037126  172410                  LDD     (R0),AC0
7314
7315  037130  012737  037142  001236  MOV     #HX32,@#$TMP2
7316  037136  012700  037640          MOV     #HXP1,R0
7317  037142  177410          HX32:   LDCFD   (R0),AC0
7318
```

```
 7319  037144  170205                          STFPS   R5
 7320
 7321  037146  012700  037630                  MOV     #HXDATO,R0
 7322  037152  174010                          STD     AC0,(R0)        ;GET RESULT
 7323
 7324  037154  012701  037640                  MOV     #HXP1,R1
 7325  037160  012702  000004                  MOV     #4,R2
 7326  037164  022120                  HX33:   CMP     (R1)+,(R0)+     ;IS IT ZERO?
 7327  037166  001402                          BEQ     HX34
 7328  037170  000137  037610                  JMP     @#HXER13
 7329  037174  077205                  HX34:   SOB     R2,HX33
 7330
 7331  037176  012704  000204                  MOV     #204,R4         ;FPS CORRECT?
 7332  037202  020405                          CMP     R4,R5
 7333  037204  001402                          BEQ     HX35
 7334  037206  000137  037336                  JMP     @#HXER4
 7335  037212  000137  037740          HX35:   JMP     @#HXDONE
 7336
 7337                                  ;R0 INCORRECT
 7338
 7339  037216  012737  037654  001242  HXER1:  MOV     #HXP2+4,@#$TMP4
 7340  037224  010037  001240                  MOV     R0,@#$TMP3
 7341  037230  104002                  1$:     ERROR   2
 7342  037232  000137  037740                  JMP     @#HXDONE
 7343
 7344  037236  012737  037660  001242  HXER5:  MOV     #HXP2+10,@#$TMP4
 7345  037244  010037  001240                  MOV     R0,@#$TMP3
 7346  037250  104002                  1$:     ERROR   2
 7347  037252  000137  037740                  JMP     @#HXDONE
 7348                                  ;REPORT BAD DATA
 7349  037256  012737  037650  001244  HXER2:  MOV     #HXP2,@#$TMP5
 7350  037264  012737  037720  001250          MOV     #HXP7,@#$TMP7
 7351  037272  012737  037630  001246  HXER22: MOV     #HXDATO,@#$TMP6
 7352  037300  104002                  1$:     ERROR   2
 7353  037302  000137  037740                  JMP     @#HXDONE
 7354                                  ;
 7355  037306  012737  037650  001244  HXER3:  MOV     #HXP2,@#$TMP5
 7356  037314  012737  037720  001250          MOV     #HXP7,@#$TMP7
 7357  037322  012737  037630  001246  HXER33: MOV     #HXDATO,@#$TMP6
 7358  037330  104002                  1$:     ERROR   2
 7359  037332  000137  037740                  JMP     @#HXDONE
 7360
 7361  037336  010537  001240          HXER4:  MOV     R5,@#$TMP3
 7362  037342  010437  001242                  MOV     R4,@#$TMP4
 7363  037346  104002                  1$:     ERROR   2
 7364  037350  000137  037740                  JMP     @#HXDONE
 7365
 7366  037354  010537  001240          HXER8:  MOV     R5,@#$TMP3
 7367  037360  010437  001242                  MOV     R4,@#$TMP4
 7368  037364  104002                  1$:     ERROR   2
 7369  037366  000137  037740                  JMP     @#HXDONE
 7370  037372  012737  037650  001244  HXER6:  MOV     #HXP2,@#$TMP5
 7371  037400  012737  037730  001250          MOV     #HXP8,@#$TMP7
 7372  037406  012737  037630  001246  HXER66: MOV     #HXDATO,@#$TMP6
 7373  037414  104002                  1$:     ERROR   2
 7374  037416  000137  037740                  JMP     @#HXDONE
```

```
7375
7376  037422  012737  037650  001244  HXER7:  MOV     #HXP2,@#$TMP5
7377  037430  012737  037730  001250          MOV     #HXP8,@#$TMP7
7378  037436  012737  037630  001246          MOV     #HXDATO,@#$TMP6
7379  037444  104002                  1$:     ERROR   2
7380  037446  000137  037740                  JMP     @#HXDONE
7381
7382  037452  032716  000001          HXER9:  BIT     #1,(SP)         ;SEE IF IT
7383  037456  001005                          BNE     1$              ;AN ODD ADDRESS
7384  037460  022716  036562                  CMP     #HX165,(SP)
7385  037464  001402                          BEQ     1$
7386  037466  000137  062566                  JMP     @#CPSPUR
7387
7388  037472  011637  001236          1$:     MOV     (SP),@#$TMP2
7389  037476  022626                          CMP     (SP)+,(SP)+
7390  037500  104002                  2$:     ERROR   2
7391  037502  000137  037740                  JMP     @#HXDONE
7392
7393  037506  162701  000003          HXER10: SUB     #3,R1
7394  037512  006301                          ASL     R1
7395  037514  012702  036562                  MOV     #HX165,R2
7396  037520  010237  001242                  MOV     R2,@#$TMP4
7397  037524  160102                          SUB     R1,R2
7398  037526  010237  001240                  MOV     R2,@#$TMP3
7399  037532  104002                  1$:     ERROR   2
7400  037534  000137  037740                  JMP     @#HXDONE
7401
7402  037540  012737  037670  001244  HXER11: MOV     #HXP4,@#$TMP5
7403  037546  012737  037700  001250          MOV     #HXP5,@#$TMP7
7404  037554  000137  037272                  JMP     @#HXER22
7405  037560  012737  037670  001244  HXER12: MOV     #HXP4,@#$TMP5
7406  037566  012737  037700  001250          MOV     #HXP5,@#$TMP7
7407  037574  012737  037630  001246          MOV     #HXDATO,@#$TMP6
7408  037602  104002                  1$:     ERROR   2
7409  037604  000137  037740                  JMP     @#HXDONE
7410
7411  037610  012737  037640  001244  HXER13: MOV     #HXP1,@#$TMP5
7412  037616  012737  037640  001250          MOV     #HXP1,@#$TMP7
7413  037624  000137  037272                  JMP     @#HXER22
7414
7415  037630  000000          HXDATO: 0
7416  037632  000000                  0
7417  037634  000000                  0
7418  037636  000000                  0
7419
7420  037640  000000          HXP1:   0
7421  037642  000000                  0
7422  037644  000000                  0
7423  037646  000000                  0
7424
7425  037650  000577          HXP2:   577
7426  037652  177776                  177776
7427  037654  177777                  177777
7428  037656  177776                  177776
7429  037660  005201          HXP3:   5201
7430  037662  000000                  0
```

```
7431  037664  000000                          0
7432  037666  000000                          0
7433  037670  100577                HXP4:     100577
7434  037672  177776                          177776
7435  037674  177777                          177777
7436  037676  177776                          177776
7437  037700  100577                HXP5:     100577
7438  037702  177776                          177776
7439  037704  000000                          0
7440  037706  000000                          0
7441  037710  000252                HXP6:     252
7442  037712  125252                          125252
7443  037714  125252                          125252
7444  037716  125252                          125252
7445
7446  037720  000577                HXP7:     577
7447  037722  177776                          177776
7448  037724  000000                          0
7449  037726  000000                          0
7450  037730  000577                HXP8:     577
7451  037732  177777                          177777
7452  037734  000000                          0
7453  037736  000000                          0
7454
7455  037740                      HXDONE:
7456  037740  104413                          RSETUP          ;GO INITIALIZE THE FPS AND STACK; AND
7457                                          ;SEE IF THE USER HAS EXPRESSED
7458                                          ;THE DESIRE TO CHANGE THE SOFTWARE
7459                                          ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
7460                                          ;THE USER TYPED CONTROL G?).
7461
7462
7463
7464
7465                                ;;*****************************************************************
7466                                ;*TEST 42       CMPD TEST
7467                                ;*
7468                                ;*THIS IS A TEST OF THE CMPD INSTRUCTION. NOTE THAT A SUBROUTINE
7469                                ;*IS USED TO SET UP OPERANDS, EXECUTE THE INSTRUCTION AND CHECK THE
7470                                ;*RESULTS
7471                                ;*
7472                                ;;*****************************************************************
7473  037742  000004                TST42:  SCOPE
7474
7475                                ;TEST THE CMPD INSTRUCTION WITH (FSRC=AC=0)
7476  037744                        AAA1:
7477  037744  104414                          LPERR           ;SET UP THE LOOP ON ERROR ADDRESS.
7478  037746  004737  040556                  JSR     PC,@#CMPSUB
7479  037752  000000  000000  000000  1$:     .WORD   0,0,0,0         ;AC0
7480  037760  000000
7481  037762  000000  000000  000000  2$:     .WORD   0,0,0,0         ;FSRC
7482  037770  000000
7483  037772  000200                  3$:     200                     ;FPS BEFORE EXECUTION
7484  037774  000204                          204                     ;FPS AFTER EXECUTION
7485  037776  000200                          200                     ;ERROR FPS
7486  040000  104002                  4$:     ERROR   2               ;FPS ERROR
```

```
7487
7488
7489                                    ;TEST CMPD WITH (AC=0) AND FSRC POSITIVE.
7490  040002                            AAA2:
7491  040002  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7492  040004  004737  040556                  JSR     PC,@#CMPSUB
7493  040010  000000  000000  000000  1$:     .WORD   0,0,0,0                 ;AC
7494  040016  000000
7495  040020  025252                    2$:     25252                           ;FSRC
7496  040022  052525                            52525
7497  040024  125252                            125252
7498  040026  052525                            52525
7499  040030  000200                    3$:     200                             ;FPS BEFORE EXECUTION
7500  040032  000200                            200                             ;FPS AFTER EXECUTION
7501  040034  000210                            210                             ;ERROR FPS
7502  040036  104002                    4$:     ERROR   2
7503
7504                                    ;TEST CMPD WITH (AC=0) AND FSRC NEGATIVE
7505  040040                            AAA3:
7506  040040  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7507  040042  004737  040556                  JSR     PC,@#CMPSUB
7508  040046  000000  000000  000000  1$:     .WORD   0,0,0,0                 ;AC
7509  040054  000000
7510  040056  125252                    2$:     125252                          ;FSRC
7511  040060  125252                            125252
7512  040062  052525                            52525
7513  040064  125252                            125252
7514  040066  000200                    3$:     200                             ;FPS BEFORE EXECUTION
7515  040070  000210                            210                             ;FPS AFTER EXECUTION
7516  040072  000200                            200                             ;ERROR FPS
7517  040074  104002                    4$:     ERROR   2
7518
7519                                    ;TEST CMPD WITH (FSRC=0) AND AC POSITIVE
7520  040076                            AAA4:
7521  040076  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7522  040100  004737  040556                  JSR     PC,@#CMPSUB
7523  040104  025252                    1$:     25252                           ;AC
7524  040106  052525                            52525
7525  040110  125252                            125252
7526  040112  052525                            52525
7527  040114  000000  000000  000000  2$:     .WORD   0,0,0,0                 ;FSRC
7528  040122  000000
7529  040124  000200                    3$:     200                             ;FPS BEFORE EXECUTION
7530  040126  000210                            210                             ;FPS AFTER EXECUTION
7531  040130  000200                            200                             ;ERROR FPS
7532  040132  104002                    4$:     ERROR   2
7533
7534
7535                                    ;TEST CMPD WITH (FSRC=0) AND AC NEGATIVE
7536  040134                            AAA5:
7537  040134  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7538  040136  004737  040556                  JSR     PC,@#CMPSUB
7539  040142  125252                    1$:     125252                          ;AC
7540  040144  125252                            125252
7541  040146  052525                            52525
7542  040150  125252                            125252
```

```
7543  040152  000000  000000  000000  2$:     .WORD   0,0,0,0                 ;FSRC
7544  040160  000000
7545  040162  000200                  3$:     200                             ;FPS BEFORE EXECUTION
7546  040164  000200                          200                             ;FPS AFTER EXECUTION
7547  040166  000210                          210                             ;ERROR FPS
7548  040170  104002                  4$:     ERROR   2
7549
7550                                  ;TEST CMPD WITH AC POSITIVE AND FSRC NEGATIVE
7551  040172                          AAA6:
7552  040172  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7553  040174  004737  040556                  JSR     PC,@#CMPSUB
7554  040200  052525                  1$:     52525                           ;AC
7555  040202  125252                          125252
7556  040204  052525                          52525
7557  040206  125252                          125252
7558  040210  125252                  2$:     125252                          ;;FSRC
7559  040212  052525                          52525
7560  040214  125252                          125252
7561  040216  052525                          52525
7562  040220  000200                  3$:     200                             ;FPS BEFORE EXECUTION
7563  040222  000210                          210                             ;FPS AFTER EXECUTION
7564  040224  000200                          200                             ;ERROR FPS
7565  040226  104002                  4$:     ERROR   2
7566
7567
7568                                  ;TEST CMPD WITH AC NEGATIVE AND FSRC POSITIVE
7569  040230                          AAA7:
7570  040230  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7571  040232  004737  040556                  JSR     PC,@#CMPSUB
7572  040236  125252                  1$:     125252                          ;AC
7573  040240  052525                          52525
7574  040242  125252                          125252
7575  040244  052525                          52525
7576  040246  052525                  2$:     52525                           ;FSRC
7577  040250  125252                          125252
7578  040252  052525                          52525
7579  040254  125252                          125252
7580  040256  000200                  3$:     200                             ;FPS BEFORE EXECUTION
7581  040260  000200                          200                             ;FPS AFTER EXECUTION
7582  040262  000210                          210                             ;ERROR FPS
7583  040264  104002                  4$:     ERROR   2
7584
7585                                  ;TEST CMPD WITH AC POSITIVE AND FSRC POSITIVE
7586                                  ;AND EAC LESS THAN EFSRC.
7587  040266                          AAA8:
7588  040266  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7589  040270  004737  040556                  JSR     PC,@#CMPSUB
7590  040274  012345                  1$:     12345                           ;AC
7591  040276  067654                          67654
7592  040300  032101                          32101
7593  040302  023456                          23456
7594  040304  023456                  2$:     23456                           ;FSRC
7595  040306  076543                          76543
7596  040310  021012                          21012
7597  040312  034567                          34567
7598  040314  000200                  3$:     200                             ;FPS BEFORE EXECUTION
```

```
7599  040316  000200                    200                             ;FPS AFTER EXECUTION
7600  040320  000210                    210                             ;ERROR FPS
7601  040322  104002              4$:   ERROR   2
7602
7603
7604                                    ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE AND EAC GREATER THAN EFSRC
7605  040324                            AAA9:
7606  040324  104414                    LPERR                         ;SET UP THE LOOP ON ERROR ADDRESS.
7607  040326  004737  040556            JSR     PC,@#CMPSUB
7608  040332  045676              1$:   45676                           ;AC
7609  040334  054321                    54321
7610  040336  012345                    12345
7611  040340  067654                    67654
7612  040342  034567              2$:   34567                           ;FSRC
7613  040344  065432                    65432
7614  040346  101234                    101234
7615  040350  056765                    56765
7616  040352  000200              3$:   200                             ;FPS BEFORE EXECUTION
7617  040354  000210                    210                             ;FPS AFTER EXECUTION
7618  040356  000200                    200                             ;ERROR FPS
7619  040360  104002              4$:   ERROR   2
7620
7621                                    ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE AND AC EQUAL TO FSRC
7622  040362                            AAA10:
7623  040362  104414                    LPERR                         ;SET UP THE LOOP ON ERROR ADDRESS.
7624  040364  004737  040556            JSR     PC,@#CMPSUB
7625  040370  012345              1$:   12345                           ;AC
7626  040372  067012                    67012
7627  040374  034567                    34567
7628  040376  012345                    012345
7629  040400  012345              2$:   12345                           ;FSRC
7630  040402  067012                    67012
7631  040404  034567                    34567
7632  040406  012345                    012345
7633  040410  000200              3$:   200                             ;FPS BEFORE EXECUTION
7634  040412  000204                    204                             ;FPS AFTER EXECUTION
7635  040414  000200                    200                             ;ERROR FPS
7636  040416  104002              4$:   ERROR   2
7637
7638                                    ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE, EAC EQUAL TO EFSRC,
7639                                    ;AND FSRC GREATER THAN AC.
7640  040420                            AAA11:
7641  040420  104414                    LPERR                         ;SET UP THE LOOP ON ERROR ADDRESS.
7642  040422  004737  040556            JSR     PC,@#CMPSUB
7643  040426  012345              1$:   12345                           ;AC
7644  040430  067012                    67012
7645  040432  034567                    34567
7646  040434  012345                    012345
7647  040436  012345              2$:   12345                           ;FSRC
7648  040440  070123                    70123
7649  040442  045670                    45670
7650  040444  123456                    123456
7651  040446  000200              3$:   200                             ;FPS BEFORE EXECUTION
7652  040450  000200                    200                             ;FPS AFTER EXECUTION
7653  040452  000210                    210                             ;ERROR FPS
7654  040454  104002              4$:   ERROR   2
```

```
                                ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE, EAC EQUAL TO EFSRC,
                                ;AND AC GREATER THAN FSRC.
040456                          AAA12:
040456  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
040460  004737  040556                  JSR     PC,@#CMPSUB
040464  054321                  1$:     54321                   ;AC
040466  076543                          76543
040470  021076                          21076
040472  054321                          54321
040474  054321                  2$:     54321                   ;FSRC
040476  065432                          65432
040500  107654                          107654
040502  032107                          32107
040504  000200                  3$:     200                     ;FPS BEFORE EXECUTION
040506  000210                          210                     ;FPS AFTER EXECUTION
040510  000200                          200                     ;ERROR FPS
040512  104002                  4$:     ERROR   2

                                ;TEST CMPD WITH AC NEGATIVE, FSRC NEGATIVE, EAC EQUAL TO EFSRC,
                                ;AND AC GREATER THAN FSRC
040514                          AAA13:
040514  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
040516  004737  040556                  JSR     PC,@#CMPSUB
040522  112345                  1$:     112345                  ;AC
040524  043210                          43210
040526  076543                          76543
040530  021076                          21076
040532  112345                  2$:     112345                  ;FSRC
040534  054321                          54321
040536  007654                          07654
040540  032107                          32107
040542  000200                  3$:     200                     ;FPS BEFORE EXECUTION
040544  000210                          210                     ;FPS AFTER EXECUTION
040546  000200                          200                     ;ERROR FPS
040550  104002                  4$:     ERROR   2

040552  000137  040746                  JMP     @#AAADONE       ;FINISHED CMPD TEST.


                                ;THIS SUBROUTINE, CMPSUB, IS CALLED TO SET UP, EXECUTE
                                ;AND CHECK THE RESULTS OF A CMPD INSTRUCTION.
                                ;IT IS CALLED THUS:
                                ;
                                ;               JSR     PC,@#CMPSUB
                                ;       ACARG:  .WORD   X,X,X,X         ;AC OPERAND
                                ;       FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
                                ;       FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
                                ;       FPSA:   .WORD   X               ;FPS AFTER EXECUTION
                                ;       FPSE:   .WORD   X               ;ERROR FPS
                                ;       ERR:    ERROR   X               ;FPS ERROR
                                ;       CONT:                           ;RETURN ADDRESS
                                ;
                                ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
                                ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, CMPD, IS EXECUTED.
```

```
7711                                    ;AFTER THE EXECUTION THE FPS IS CHECKED AGAINST FPSA. IF IT IS A MATCH
7712                                    ;THEN THERE WAS NO ERROR AND CONTROL IS RETURNED TO CONT. IF
7713                                    ;THE FPS IS INCORRECT IT IS COMPARED WITH FPSE IN AN ATTEMPT TO ANALYSE
7714                                    ;THE FAILURE. IF THE FPS IS THE SAME AS FPSE THEN CONTROL IS
7715                                    ;RETURNED TO THE ERROR CALL AT LOCATION ERR. IF THE FPS WAS
7716                                    ;NOT CORRECT BUT DIDN'T MATCH FPSE A GENERAL ERROR IS REPORTED
7717                                    ;AND CONTROL IS PASSED TO CONT.
7718
7719  040556  012601                    CMPSUB: MOV     (SP)+,R1        ;PICK UP A POINTER TO THE
7720                                                                     ;ARGUMENTS.
7721  040560  016100  000020                    MOV     20(R1),R0       ;GET THE FPS BEFORE EXECUTION.
7722  040564  170100                            LDFPS   R0              ;LOAD IT INTO THE FPS.
7723
7724  040566  012737  040610  001236            MOV     #1$,@#$TMP2     ;SAVE ADDRESS OF CMPD INSTRUCTION.
7725  040574  010100                            MOV     R1,R0           ;GET ADDRESS OF AC OPERAND.
7726  040576  172410                            LDD     (R0),AC0        ;LOAD AC0 OPERAND
7727
7728  040600  010100                            MOV     R1,R0           ;COMPUTE FSRC OPERAND
7729  040602  062700  000010                    ADD     #10,R0          ;ADDRESS
7730
7731  040606  000240                            NOP                     ;FOR SCOPING.
7732  040610  173410                    1$:     CMPD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
7733
7734  040612  170205                            STFPS   R5              ;SAVE FPS AFTER INSTRUCTION.
7735
7736  040614  016104  000022                    MOV     22(R1),R4       ;GET EXPECTED FPS.
7737                                                                     ;IF INCORRECT SET UP FOR
7738  040620  010137  001240                    MOV     R1,@#$TMP3      ;AN ERROR CALL.
7739  040624  010137  001242                    MOV     R1,@#$TMP4
7740  040630  062737  000010  001242            ADD     #10,@#$TMP4
7741  040636  010537  001244                    MOV     R5,@#$TMP5
7742  040642  010437  001246                    MOV     R4,@#$TMP6
7743  040646  020405                            CMP     R4,R5           ;WAS FPS CORRECT?
7744  040650  001410                            BEQ     3$              ;BRANCH IF YES.
7745
7746
7747  040652  026105  000024                    CMP     24(R1),R5       ;WAS THE FPS THE SAME
7748                                                                     ;AS THE EXPECTED INCORRECT FPS?
7749  040656  001003                            BNE     2$              ;BRANCH IF NO MATCH.
7750
7751  040660  062701  000026                    ADD     #26,R1          ;IF THE EXPECTED INCORRECT
7752                                                                 ;FPS MATCHED THE RESULTANT FPS
7753  040664  000111                            JMP     (R1)            ;RETURN TO THE ERROR CALL
7754                                                                     ;IN THE CALLING ROUTINE.
7755
7756  040666  104002                    2$:     ERROR   2               ;OTHERWISE REPORT INCORRECT FPS
7757  040670  000411                            BR      5$
7758
7759  040672  012700  040736            3$:     MOV     #CMPTMP,R0      ;IF FPS WAS CORRECT MAKE SURE
7760  040676  174010                            STD     AC0,(R0)        ;AC0 WAS NOT AFFECTED BY CMPD.
7761  040700  010102                            MOV     R1,R2
7762  040702  012703  000004                    MOV     #4,R3
7763  040706  022220                    4$:     CMP     (R2)+,(R0)+
7764  040710  001003                            BNE     6$
7765  040712  077303                            SOB     R3,4$
7766
```

```
7767  040714  000161  000030          5$:     JMP     30(R1)                  ;RETURN
7768
7769  040720                          6$:                                     ;REPORT AC0 MODIFIED BY CMPD
7770  040720  010137  001240                  MOV     R1,@#$TMP3
7771  040724  012737  040736  001242          MOV     #CMPTMP,@#$TMP4
7772  040732  104002                  7$:     ERROR   2
7773  040734  000767                          BR      5$                      ;RETURN
7774
7775  040736  000000  000000  000000  CMPTMP: .WORD   0,0,0,0
7776  040744  000000
7777
7778
7779
7780  040746                          AAADONE:
7781  040746  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
7782                                                                  ;SEE IF THE USER HAS EXPRESSED
7783                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
7784                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
7785                                                                  ;THE USER TYPED CONTROL G?).
7786
7787
7788
7789
7790                                  ;;*****************************************************************
7791                                  ;*TEST 43       DIVD WITH (FSRC=0) AND (BUT FD) TEST
7792                                  ;*
7793                                  ;*THIS IS A TEST OF THE DIVD INSTRUCTION WITH A
7794                                  ;*ZERO DIVISOR. THE CONDITION IS CHECKED WITH BOTH
7795                                  ;*TRAP ENABLED AND TRAPS DISABLED.
7796                                  ;*
7797                                  ;;*****************************************************************
7798  040750  000004                  TST43:  SCOPE
7799
7800                                  ;FIRST TEST DIVD WITH (FSRC=AC=0) AND TRAPS DISABLED.
7801  040752  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7802  040754  012704  040200          BBB0:   MOV     #40200,R4       ;SET UP FPS
7803                                                                  ;WITH INTERRUPTS
7804                                                                  ;DISABLED.
7805  040760  170104                          LDFPS   R4
7806  040762  012737  041224  000244          MOV     #BBBER1,@#FPVECT;SET UP FOR ANY FP INTERRUPTS.
7807  040770  012737  041010  001236          MOV     #BBB1,@#$TMP2
7808  040776  012700  041430                  MOV     #BBBP1,R0       ;SET UP AC0 = 0
7809  041002  172410                          LDD     (R0),AC0
7810  041004  012701  041430                  MOV     #BBBP1,R1       ;FSRC = 0
7811
7812  041010  174411                  BBB1:   DIVD    (R1),AC0        ;TEST INSTRUCTION
7813
7814  041012  170205                          STFPS   R5              ;GET FPS
7815  041014  170303                          STST    R3              ;GET FEC
7816
7817  041016  012704  140204                  MOV     #140204,R4      ;EXPECTED FPS.
7818  041022  020405                          CMP     R4,R5           ;IS FPS CORRECT.
7819  041024  001131                          BNE     BBBER2          ;IF INCORRECT BRANCH.
7820
7821  041026  012702  000004                  MOV     #4,R2           ;EXPECTED FEC.
7822  041032  020203                          CMP     R2,R3           ;IS FEC CORRECT?
```

```
                                        BNE     BBBER3          ;IF INCORRECT BRANCH.

                                ;TEST DIVD WITH (FSRC=0) AND TRAPS DISABLED.
                                BBB2:
                                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
                                        MOV     #40200,R4       ;LOAD FPS WITH TRAPS DISABLED.
                                        LDFPS   R4

                                        MOV     #BBB3,@#$TMP2
                                        MOV     #BBBP2,R0       ;SET UP AC0 OPERAND (NON ZERO).
                                        LDD     (R0),AC0
                                        MOV     #BBBP1,R0       ;FSRC=0
                                BBB3:   DIVD    (R0),AC0

                                        STFPS   R5              ;GET FPS.
                                        STST    R3              ;GET FEC.

                                        MOV     #140200,R4              ;EXPECTED FPS.
                                        CMP     R4,R5           ;IS FPS CORRECT?
                                        BNE     BBBER2          ;IF INCORRECT BRANCH.

                                        MOV     #4,R2           ;EXPECTED FEC.
                                        CMP     R2,R3           ;WAS FEC CORRECT?
                                        BNE     BBBER3          ;IF INCORRECT BRANCH.

                                ;TEST DIVD WITH FSRC=0) AND TRAPS ENABLED.
                                BBB4:
                                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
                                        MOV     #200,R4         ;SET UP FPS. TRAP ENABLED.
                                        LDFPS   R4

                                        MOV     #BBB5,@#$TMP2
                                        MOV     #BBBP2,R0       ;SET UP AC0 OPERAND (NON ZERO).
                                        LDD     (R0),AC0

                                        MOV     #BBB6,@#FPVECT  ;SET UP FOR THE EXPECTED INTERRUPT.
                                        MOV     #BBBP1,R0       ;FSRC=0

                                BBB5:   DIVD    (R0),AC0        ;TEST INSTRUCTION (SHOULD RESULT IN TRAP).
                                        CFCC

                                        BR      BBBER4          ;GO REPORT FAILURE, NO TRAP.

                                BBB6:   CMP     #BBB5+2,(SP)    ;TRAP TO HERE WHEN THE DIVISION BY 0
                                                                ;OCCURS. FIRST SEE IF THE ADDRESS OF
                                                                ;THE TRAP IS 2+THE ADDRESS OF THE TEST
                                                                ;DIVD INSTRUCTION.

                                        BEQ     1$
                                        JMP     @#FPSPUR        ;IF NOT THEN REPORT AN UNEXPECTED
                                                                ;FP TRAP.
                                1$:     STFPS   R5              ;GET FPS.
                                        STST    R3              ;GET FEC.
                                        CMP     (SP)+,(SP)+     ;RESET THE STACK.

                                        MOV     #100200,R4      ;EXPECTED FPS.
                                        CMP     R4,R5           ;IS FPS CORRECT?
```

```
7879  041206  001040                          BNE     BBBER2          ;IF INCORRECT BRANCH.
7880
7881  041210  012702  000004                  MOV     #4,R2           ;EXPECTED FEC.
7882  041214  020203                          CMP     R2,R3           ;IS FEC CORRECT?
7883  041216  001047                          BNE     BBBER3          ;IF INCORRECT BRANCH.
7884
7885  041220  000137  041450                  JMP     @#BBBDONE       ;OTHERWISE GO TO NEXT TEST.
7886
7887
7888                                  ;TRAP HERE IF AN UNEXPECTED INTERRUPT OCCURS.
7889  041224  062737  000002  001236  BBBER1: ADD     #2,@#$TMP2      ;SEE IF THE INTERRUPT OCCURRED
7890                                                                  ;DURING THE EXECUTION OF THE DIVD
7891                                                                  ;INSTRUCTION BEING TESTED.
7892  041232  021637  001236                  CMP     (SP),@#$TMP2
7893  041236  001402                          BEQ     1$
7894  041240  000137  062534                  JMP     @#FPSPUR        ;IF NOT REPORT UNEXPECTED FP TRAP.
7895
7896  041244  022626                  1$:     CMP     (SP)+,(SP)+     ;RESET THE STACK.
7897  041246  170303                          STST    R3              ;GET FEC.
7898  041250  170205                          STFPS   R5              ;GET FPS.
7899  041252  012737  000004  001240          MOV     #4,@#$TMP3      ;EXPECTED FEC.
7900  041260  010337  001242                  MOV     R3,@#$TMP4
7901  041264  010537  001244                  MOV     R5,@#$TMP5
7902  041270  010037  001250                  MOV     R0,@#$TMP7
7903  041274  012737  140200  001246          MOV     #140200,@#$TMP6
7904  041302  104002                  2$:     ERROR   2
7905                                                                  ;WITH TRAPS DISABLED.
7906  041304  000137  041450                  JMP     @#BBBDONE
7907
7908                                  ;REPORT FPS INCORRECT:
7909  041310  010537  001242          BBBER2: MOV     R5,@#$TMP4
7910  041314  010437  001244                  MOV     R4,@#$TMP5
7911  041320  010037  001246                  MOV     R0,@#$TMP6
7912  041324  010137  001250                  MOV     R1,@#$TMP7
7913  041330  104002                  1$:     ERROR   2
7914  041332  000137  041450                  JMP     @#BBBDONE
7915
7916                                  ;REPORT FEC INCORRECT:
7917  041336  010337  001242          BBBER3: MOV     R3,@#$TMP4
7918  041342  010237  001240                  MOV     R2,@#$TMP3
7919  041346  010037  001246                  MOV     R0,@#$TMP6
7920  041352  010137  001250                  MOV     R1,@#$TMP7
7921  041356  104002                  1$:     ERROR   2
7922  041360  000137  041450                  JMP     @#BBBDONE
7923
7924
7925                                  ;REPORT NO TRAP OCCURRED AFTER TRYING TO DIVIDE
                                     ;BY ZERO WITH ALL TRAPS ENABLED.
7926  041364  170303          BBBER4: STST    R3                      ;GET FEC.
7927  041366  170205                  STFPS   R5                      ;GET FPS.
7928  041370  012737  000004  001242          MOV     #4,@#$TMP4
7929  041376  010337  001240                  MOV     R3,@#$TMP3
7930  041402  010537  001244                  MOV     R5,@#$TMP5
7931  041406  012737  100200  001246          MOV     #100200,@#$TMP6
7932  041414  010037  001250                  MOV     R0,@#$TMP7
7933  041420  010137  001252                  MOV     R1,@#$TMP10
7934  041424  104002                  1$:     ERROR   2
```

```
7935  041426  000410                          BR      BBBDONE
7936
7937  041430  000000  000000  000000  BBBP1:  .WORD   0,0,0,0
7938  041436  000000
7939  041440  012345  054321  023456  BBBP2:  .WORD   12345,54321,23456,76543
7940  041446  076543
7941
7942
7943
7944  041450                          BBBDONE:
7945  041450  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
7946                                                                  ;SEE IF THE USER HAS EXPRESSED
7947                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
7948                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
7949                                                                  ;THE USER TYPED CONTROL G?).
7950
7951
7952
7953                                  ;;*****************************************************************
7954                                  ;*TEST 44       DIVF TEST
7955                                  ;*
7956                                  ;*THIS IS A TEST OF THE DIVF INSTRUCTION. NOTE THAT A SUBROUTINE IS
7957                                  ;*USED TO SET UP THE OPERANDS, EXECUTE THE INSTRUCTION AND CHECK THE
7958                                  ;*RESULTS.
7959                                  ;*
7960                                  ;;*****************************************************************
7961  041452  000004                  TST44:  SCOPE
7962
7963                                  ;CHECK DIVF WITH (AC=0).
7964  041454                          CCC1:
7965  041454  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7966  041456  004767  000552                  JSR     PC,DIVFSUB
7967  041462  000000  000000          1$:     .WORD   0,0             ;AC
7968  041466  012345  067012          2$:     .WORD   12345,67012     ;FSRC
7969  041472  000000  000000          3$:     .WORD   0,0             ;RES
7970  041476  000000                  4$:     0                       ;FPS BEFORE EXECUTION.
7971  041500  000004                          4                       ;FPS AFTER EXECUTION
7972  041502  012345  067012          5$:     .WORD   12345,67012     ;ERROR RESULT
7973  041506  104002                  6$:     ERROR   2
7974
7975                                  ;TEST DIVF WITH AC POSITIVE, FSRC POSITIVE AND IN ROUND MODE.
7976  041510                          CCC2:
7977  041510  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7978  041512  004737  042234                  JSR     PC,@#DIVFSUB
7979  041516  065652  125252          1$:     .WORD   65652,125252    ;AC
7980  041522  065600  000000          2$:     .WORD   65600,0         ;FSRC
7981  041526  040252  125252          3$:     .WORD   40252,125252    ;RES
7982  041532  003000                  4$:     3000                    ;FPS BEFORE EXECUTION.
7983  041534  003000                          3000                    ;FPS AFTER EXECUTION.
7984  041536  040052  125252          5$:     .WORD   40052,125252    ;ERROR RESULT.
7985  041542  104002                  6$:     ERROR   2
7986
7987                                  ;TEST DIVF WITH AC POSITIVE, FSRC POSITIVE.
7988  041544                          CCC3:
7989  041544  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
7990  041546  004767  000462                  JSR     PC,DIVFSUB
```

```
 7991  041552  076400  000000          1$:     .WORD   76400,0          ;AC
 7992  041556  076400  000000          2$:     .WORD   76400,0          ;FSRC
 7993  041562  040200  000000          3$:     .WORD   40200,0          ;RES
 7994  041566  001000                  4$:     1000                     ;FPS BEFORE EXECUTION.
 7995  041570  001000                          1000                     ;FPS AFTER EXECUTION.
 7996  041572  140200  000000          5$:     .WORD   140200,0         ;ERROR RES.
 7997
 7998  041576  104002                  6$:     ERROR   2                ;SIGN BAD
 7999
 8000                                  ;TEST DIVF WITH BOTH OPERANDS POSITIVE.
 8001  041600                          CCC4:
 8002  041600  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
 8003  041602  004737  042234                  JSR     PC,@#DIVFSUB
 8004  041606  056777  177777          1$:     .WORD   56777,177777     ;AC
 8005  041612  054200  000000          2$:     .WORD   54200,0          ;FSRC
 8006  041616  042777  177777          3$:     .WORD   42777,177777     ;RES
 8007  041622  000000                  4$:     0                        ;FPS BEFORE EXECUTION.
 8008  041624  000000                          0                        ;FPS AFTER EXECUTION.
 8009  041626  002000  002000          5$:     .WORD   2000,2000        ;ERROR RES.
 8010  041632  104002                  6$:     ERROR   2
 8011
 8012                                  ;TEST THE DIVF INSTRUCTION:
 8013  041634                          CCC5:
 8014  041634  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
 8015  041636  004737  042234                  JSR     PC,@#DIVFSUB
 8016  041642  012377  177777          1$:     .WORD   12377,177777     ;AC
 8017  041646  012300  000000          2$:     .WORD   12300,0          ;FSRC
 8018  041652  040252  125252          3$:     .WORD   40252,125252     ;RES
 8019  041656  000000                  4$:     0                        ;FPS BEFORE EXECUTION.
 8020  041660  000000                          0                        ;FPS AFTER EXECUTION.
 8021  041662  177777  177777          5$:     .WORD   -1,-1            ;ERROR RES.
 8022  041666  104002                  6$:     ERROR   2
 8023
 8024                                  ;TEST DIVIDE ALGORITHM. TEST ROUND CONSTANT.
 8025  041670                          CCC6:
 8026  041670  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
 8027  041672  004737  042234                  JSR     PC,@#DIVFSUB
 8028  041676  064600  000001          1$:     .WORD   64600,1          ;AC
 8029  041702  066600  000000          2$:     .WORD   66600,0          ;FSRC
 8030  041706  036200  000001          3$:     .WORD   36200,1          ;RES
 8031  041712  000000                  4$:     0                        ;FPS BEFORE EXECUTION.
 8032  041714  000000                          0                        ;FPS AFTER EXECUTION.
 8033  041716  003000  003000          5$:     .WORD   3000,3000        ;ERROR RES.
 8034  041722  104002                  6$:     ERROR   2
 8035
 8036                                  ;TEST DIVF.
 8037  041724                          CCC7:
 8038  041724  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
 8039  041726  004737  042234                  JSR     PC,@#DIVFSUB
 8040  041732  034577  177776          1$:     .WORD   34577,177776     ;AC
 8041  041736  023400  000000          2$:     .WORD   23400,0          ;FSRC
 8042  041742  051377  177776          3$:     .WORD   51377,177776     ;RES
 8043  041746  000017                  4$:     17                       ;FPS BEFORE EXECUTION.
 8044  041750  000000                          0                        ;FPS AFTER EXECUTION.
 8045  041752  003400  003400          5$:     .WORD   3400,3400        ;ERROR RES.
 8046  041756  104002                  6$:     ERROR   2
```

```
8047
8048
8049                                    ;DIVF TEST.
8050  041760                            CCC8:
8051  041760  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8052  041762  004737  042234                    JSR     PC,@#DIVFSUB
8053  041766  067652  125252           1$:      .WORD   67652,125252    ;AC
8054  041772  056500  000000           2$:      .WORD   56500,0         ;FSRC
8055  041776  051343  107070           3$:      .WORD   51343,107070    ;RES
8056  042002  000000                   4$:      0                       ;FPS BEFORE EXECUTION.
8057  042004  000000                            0                       ;FPS AFTER EXECUTION.
8058  042006  051543  107070           5$:      .WORD   51543,107070    ;ERROR RES.
8059  042012  104002                   6$:      ERROR   2               ;DIDN'T INCREMENT THE EXPONENT
8060                                                                    ;AFTER DIVID NORMALIZATION.
8061
8062                                    ;DIVF WITH AC NEGATIVE, FSRC NEGATIVE.
8063  042014                            CCC9:
8064  042014  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8065  042016  004737  042234                    JSR     PC,@#DIVFSUB
8066  042022  140400  000000           1$:      .WORD   140400,0        ;AC
8067  042026  140500  000000           2$:      .WORD   140500,0        ;FSRC
8068  042032  040052  125253           3$:      .WORD   040052,125253   ;RES
8069  042036  000000                   4$:      0                       ;FPS BEFORE EXECUTION.
8070  042040  000000                            0                       ;FPS AFTER EXECUTION.
8071  042042  140052  125253           5$:      .WORD   140052,125253   ;ERROR RES.
8072  042046  104002                   6$:      ERROR   2               ;BAD SIGN.
8073
8074                                    ;DIVF WITH AC NEGATIVE AND FSRC POSITIVE.
8075  042050                            CCC10:
8076  042050  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8077  042052  004737  042234                    JSR     PC,@#DIVFSUB
8078  042056  160077  000000           1$:      .WORD   160077,0        ;AC
8079  042062  040277  000000           2$:      .WORD   40277,0         ;FSRC
8080  042066  160000  000000           3$:      .WORD   160000,0        ;RES
8081  042072  000007                   4$:      7                       ;FPS BEFORE EXECUTION.
8082  042074  000010                            10                      ;FPS AFTER EXECUTION.
8083  042076  060000  000000           5$:      .WORD   60000,0         ;ERROR RES.
8084  042102  104002                   6$:      ERROR   2               ;BAD SIGN.
8085
8086                                    ;DIVF WITH AC POSITIVE AND FSRC NEGATIVE.
8087  042104                            CCC11:
8088  042104  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8089  042106  004737  042234                    JSR     PC,@#DIVFSUB
8090  042112  040400  000000           1$:      .WORD   40400,0         ;AC
8091  042116  140500  000000           2$:      .WORD   140500,0        ;FSRC
8092  042122  140052  125253           3$:      .WORD   140052,125253   ;RES
8093  042126  000017                   4$:      17                      ;FPS BEFORE EXECUTION.
8094  042130  000010                            10                      ;FPS AFTER EXECUTION.
8095  042132  040052  125253           5$:      .WORD   40052,125253    ;ERROR RES.
8096  042136  104002                   6$:      ERROR   2               ;BAD SIGN.
8097
8098
8099                                    ;TEST DIVF BOTH OPERANDS POSITIVE AND TRUNCATE MODE.
8100  042140                            CCC12:
8101  042140  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8102  042142  004737  042234                    JSR     PC,@#DIVFSUB
```

```
 8103  042146  060100  000001          1$:     .WORD   60100,1         ;AC
 8104  042152  040300  000000          2$:     .WORD   40300,0         ;FSRC
 8105  042156  060000  000000          3$:     .WORD   60000,0         ;RES
 8106  042162  000052                  4$:     52                      ;FPS BEFORE EXECUTION.
 8107  042164  000040                          40                      ;FPS AFTER EXECUTION.
 8108  042166  060000  000001          5$:     .WORD   60000,1         ;ERROR RES.
 8109  042172  104002                  6$:     ERROR   2               ;TRUNCATION ERROR
 8110
 8111                                  ;DIVF WITH POSITIVE OPERANDS AND ROUND MODE.
 8112  042174                          CCC13:
 8113  042174  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 8114  042176  004767  000032                  JSR     PC,DIVFSUB
 8115  042202  060100  000001          1$:     .WORD   60100,1         ;AC
 8116  042206  040300  000000          2$:     .WORD   40300,0         ;FSRC
 8117  042212  060000  000001          3$:     .WORD   60000,1         ;RES
 8118  042216  000005                  4$:     5                       ;FPS BEFORE EXECUTION.
 8119  042220  000000                          0                       ;FPS AFTER EXECUTION.
 8120  042222  060000  000000          5$:     .WORD   60000,0         ;ERROR RES.
 8121  042226  104002                  6$:     ERROR   2               ;ROUND ERROR.
 8122
 8123  042230  000137  042460                  JMP     @#CCCDONE       ;GO TO NEXT TEST.
 8124
 8125                                  ;THIS SUBROUTINE, DIVFSUB, IS CALLED TO SET UP, EXECUTE
 8126                                  ;AND CHECK THE RESULT OF A DIVF INSTRUCTION. IT IS CALLED THUS:
 8127                                  ;
 8128                                  ;               JSR     PC,@#DIVFSUB
 8129                                  ;       ACARG:  .WORD   X,X             ;AC OPERAND
 8130                                  ;       FSRCARG:.WORD   X,X             ;FSRC OPERAND
 8131                                  ;       RES:    .WORD   X,X             ;EXPECTED RESULT
 8132                                  ;       FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
 8133                                  ;       FPSA:   .WORD   X               ;FPS AFTER EXECUTION
 8134                                  ;       ERRES:  .WORD   X,X             ;ERROR RESULT
 8135                                  ;       ERR:    ERROR   X               ;RESULT ERROR
 8136                                  ;       CONT:                           ;RETURN ADDRESS
 8137                                  ;
 8138                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
 8139                                  ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, DIVF IS EXECUTED.
 8140                                  ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
 8141                                  ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
 8142                                  ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
 8143                                  ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
 8144                                  ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
 8145                                  ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
 8146                                  ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
 8147                                  ;THEN THE FAILURE IS REPORTED IN DIVFSUB AND CONTROL IS PASSED TO
 8148                                  ;CONT. IF NO ERRORS ARE DETECTED THEN DIVFSUB RETURNS CONTROL
 8149                                  ;TO CONT.
 8150
 8151  042234  012601                  DIVFSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
 8152  042236  012700  000200                  MOV     #200,R0         ;SET FD MODE.
 8153  042242  170100                          LDFPS   R0
 8154  042244  010100                          MOV     R1,R0           ;LOAD THE AC OPERAND.
 8155  042246  172410                          LDD     (R0),AC0
 8156  042250  016100  000014                  MOV     14(R1),R0       ;LOAD THE FPS
 8157  042254  170100                          LDFPS   R0
 8158  042256  012737  042272  001236          MOV     #1$,@#$TMP2
```

```
8159  042264  010100                          MOV     R1,R0
8160  042266  062700  000004                  ADD     #4,R0           ;ESTABLISH A POINTER TO FSRC.
8161
8162  042272  174410                  1$:     DIVF    (R0),AC0        ;TEST INSTRUCTION.
8163
8164  042274  170204                          STFPS   R4              ;GET THE FPS.
8165  042276  012700  000200                  MOV     #200,R0         ;SET FD MODE
8166  042302  170100                          LDFPS   R0
8167
8168  042304  012700  042450                  MOV     #DIVFT,R0       ;GET THE RESULT OF THE DIVF.
8169  042310  174010                          STD     AC0,(R0)
8170
8171  042312  010102                          MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
8172  042314  010237  001240                  MOV     R2,@#$TMP3
8173  042320  062702  000004                  ADD     #4,R2
8174  042324  010237  001242                  MOV     R2,@#$TMP4
8175  042330  062702  000004                  ADD     #4,R2
8176  042334  010237  001244                  MOV     R2,@#$TMP5
8177  042340  012737  042450  001246          MOV     #DIVFT,@#$TMP6
8178  042346  010437  001250                  MOV     R4,@#$TMP7
8179  042352  016137  000016  001252          MOV     16(R1),@#$TMP10
8180
8181  042360  021061  000010                  CMP     (R0),10(R1)     ;IS THE RESULT CORRECT?
8182  042364  001011                          BNE     10$             ;IF INCORRECT BRANCH.
8183  042366  026061  000002  000012          CMP     2(R0),12(R1)
8184  042374  001005                          BNE     10$
8185
8186  042376  026104  000016                  CMP     16(R1),R4       ;IS FPS CORRECT?
8187  042402  001020                          BNE     15$             ;IF INCORRECT BRANCH.
8188  042404  000161  000026                  JMP     26(R1)          ;IF NO ERRORS OCCURRED RETURN.
8189
8190  042410  021061  000020          10$:    CMP     (R0),20(R1)     ;DOES THE INCORRECT RESULT
8191  042414  001010                          BNE     11$             ;MATCH THE ANTICIPATED INCORRECT RESULT.
8192  042416  026061  000002  000022          CMP     2(R0),22(R1)
8193  042424  001004                          BNE     11$             ;BRANCH IF NO.
8194
8195  042426  010102                          MOV     R1,R2           ;IT MATCHED SO RETURN TO THE ERROR
8196                                                                  ;REPORT AT THE CALLING ROUTINE.
8197  042430  062702  000024                  ADD     #24,R2
8198  042434  000112                          JMP     (R2)
8199
8200  042436                          11$:                            ;REPORT RESULT INCORRECT.
8201  042436  104002                  12$:    ERROR   2
8202  042440  000161  000026          13$:    JMP     26(R1)
8203
8204  042444                          15$:                            ;REPORT FPS INCOFRECT.
8205  042444  104002                  16$:    ERROR   2
8206  042446  000774                          BR      13$
8207
8208  042450  000000  000000  000000  DIVFT:  .WORD   0,0,0,0
8209  042456  000000
8210
8211  042460                          CCCDONE:
8212  042460  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
8213                                                                  ;SEE IF THE USER HAS EXPRESSED
8214                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
```

```
                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                        ;THE USER TYPED CONTROL G?).



                                ;;*******************************************************************
                                ;*TEST 45        DIVD TEST
                                ;*
                                ;*THIS IS A TEST OF THE DIVD INSTRUCTION. NOTE THAT A SUBROUTINE IS
                                ;*USED TO SET UP THE OPERANDS, EXECUTE THE INSTRUCTION AND CHECK THE RESULTS.
                                ;*
                                ;;*******************************************************************
042462  000004                TST45:  SCOPE

                                ;DIVD TEST WITH POSITIVE OPERANDS AND IN ROUND MODE.
042464                          DDD1:
042464  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
042466  004737  043154                JSR     PC,@#DIVDSUB
042472  034277  000000  000000  1$:   .WORD   34277,0,0,0      ;AC
042500  000000
042502  040277  000000  000000  2$:   .WORD   40277,0,0,0      ;FSRC
042510  000000
042512  034200  000000  000000  3$:   .WORD   34200,0,0,0      ;RES
042520  000000
042522  000200                  4$:   200                     ;FPS BEFORE EXECUTION.
042524  000200                        200                     ;FPS AFTER EXECUTION.
042526  177777  177777  177777  5$:   .WORD   -1,-1,-1,-1     ;ERROR RES.
042534  177777
042536  104002                  6$:   ERROR   2

                                ;DIVD WITH AC NEGATIVE AND FSRC POSITIVE IN TRUNCATE MODE.
042540                          DDD2:
042540  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
042542  004737  043154                JSR     PC,@#DIVDSUB
042546  134277  000000  000000  1$:   .WORD   134277,0,0,0     ;AC
042554  000000
042556  040277  000000  000000  2$:   .WORD   40277,0,0,0      ;FSRC
042564  000000
042566  134200  000000  000000  3$:   .WORD   134200,0,0,0     ;RES
042574  000000
042576  000207                  4$:   207                     ;FPS BEFORE EXECUTION.
042600  000210                        210                     ;FPS AFTER EXECUTION.
042602  177777  177777  177777  5$:   .WORD   -1,-1,-1,-1     ;ERROR RESULT.
042610  177777
042612  104002                  6$:   ERROR   2

                                ;DIVD TEST WITH OPERANDS BOTH NEGATIVE AND IN TRUNCATE MODE.
042614                          DDD3:
042614  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
042616  004767  000332                JSR     PC,DIVDSUB
042622  134300  000000  000000  1$:   .WORD   134300,0,0,1     ;AC
042630  000001
042632  140300  000000  000000  2$:   .WORD   140300,0,0,0     ;FSRC
042640  000000
042642  034200  000000  000000  3$:   .WORD   34200,0,0,0      ;RES
042650  000000
```

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8271  042652  000250                  4$:     250                     ;FPS BEFORE EXECUTION.
8272  042654  000240                          240                     ;FPS AFTER EXECUTION.
8273  042656  034200  000000  000000  5$:     .WORD   34200,0,0,1     ;ERROR RES.
8274  042664  000001
8275  042666  104002                  6$:     ERROR   2               ;TRUNCATION ERROR.
8276
8277                                  ;DIVD WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
8278  042670                          DDD4:
8279  042670  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8280  042672  004737  043154                  JSR     PC,@#DIVDSUB
8281  042676  034300  000000  000000  1$:     .WORD   34300,0,0,1     ;AC
8282  042704  000001
8283  042706  140300  000000  000000  2$:     .WORD   140300,0,0,0    ;FSRC
8284  042714  000000
8285  042716  134200  000000  000000  3$:     .WORD   134200,0,0,1    ;RES
8286  042724  000001
8287  042726  000207                  4$:     207                     ;FPS BEFORE EXECUTION.
8288  042730  000210                          210                     ;FPS AFTER EXECUTION.
8289  042732  134200  000000  000000  5$:     .WORD   134200,0,0,0    ;ERROR RES.
8290  042740  000000
8291  042742  104002                  6$:     ERROR   2               ;ROUND ERROR.
8292
8293                                  ;DIVD TEST.
8294  042744                          DDD5:
8295  042744  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8296  042746  004737  043154                  JSR     PC,@#DIVDSUB
8297  042752  100400  000000  000000  1$:     .WORD   100400,0,0,0    ;AC
8298  042760  000000
8299  042762  000500  000000  000000  2$:     .WORD   500,0,0,0       ;FSRC
8300  042770  000000
8301  042772  140052  125252          3$:     .WORD   140052,125252   ;RES
8302  042776  125252  125252                  .WORD   125252,125252
8303  043002  007647                  4$:     7647                    ;FPS BEFORE EXECUTION.
8304  043004  007650                          7650                    ;FPS AFTER EXECUTION.
8305  043006  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
8306  043014  177777
8307  043016  104002                  6$:     ERROR   2
8308
8309
8310                                  ;DIVD TEST WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
8311  043020                          DDD6:
8312  043020  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8313  043022  004737  043154                  JSR     PC,@#DIVDSUB
8314  043026  000400  000000  000000  1$:     .WORD   400,0,0,0       ;AC
8315  043034  000000
8316  043036  100500  000000  000000  2$:     .WORD   100500,0,0,0    ;FSRC
8317  043044  000000
8318  043046  140052  125252          3$:     .WORD   140052,125252   ;RES
8319  043052  125252  125253                  .WORD   125252,125253
8320  043056  007707                  4$:     7707                    ;FPS BEFORE EXECUTION.
8321  043060  007710                          7710                    ;FPS AFTER EXECUTION.
8322  043062  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
8323  043070  177777
8324  043072  104002                  6$:     ERROR   2
8325
8326                                  ;DIVD TEST.
```

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8327  043074                                  DDD7:
8328  043074  104414                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8329  043076  004737  043154                          JSR     PC,@#DIVDSUB
8330  043102  170360  170360                  1$:     .WORD   170360,170360   ;AC
8331  043106  170360  170360                          .WORD   170360,170360
8332  043112  170360  170360                  2$:     .WORD   170360,170360   ;FSRC
8333  043116  170360  170360                          .WORD   170360,170360
8334  043122  040200  000000  000000          3$:     .WORD   40200,0,0,0     ;RES
8335  043130  000000
8336  043132  007717                          4$:     7717                    ;FPS BEFORE EXECUTION.
8337  043134  007700                                  7700                    ;FPS AFTER EXECUTION.
8338  043136  177777  177777  177777          5$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
8339  043144  177777
8340  043146  104002                          6$:     ERROR   2
8341
8342  043150  000137  043414                          JMP     @#DDDDONE       ;GO TO NEXT TEST.
8343
8344
8345                                          ;THIS SUBROUTINE, DIVDSUB, IS CALLED TO SET UP, EXECUTE
8346                                          ;AND CHECK THE RESULT OF A DIVD INSTRUCTION. IT IS CALLED THUS:
8347                                          ;
8348                                          ;               JSR     PC,@#DIVDSUB
8349                                          ;       ACARG:  .WORD   X,X,X,X                 ;AC OPERAND
8350                                          ;       FSRCARG:.WORD   X,X,X,X                 ;FSRC OPERAND
8351                                          ;       RES:    .WORD   X,X,X,X                 ;EXPECTED RESULT
8352                                          ;       FPSB:   .WORD   X                       ;FPS BEFORE EXECUTION
8353                                          ;       FPSA:   .WORD   X                       ;FPS AFTER EXECUTION
8354                                          ;       ERRES:  .WORD   X,X,X,X                 ;ERROR RESULT
8355                                          ;       ERR:    ERROR   X                       ;RESULT ERROR
8356                                          ;       CONT:                                   ;RETURN ADDRESS
8357                                          ;
8358                                          ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
8359                                          ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, DIVD IS EXECUTED.
8360                                          ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
8361                                          ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
8362                                          ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
8363                                          ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
8364                                          ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
8365                                          ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
8366                                          ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
8367                                          ;THEN THE FAILURE IS REPORTED IN DIVDSUB AND CONTROL IS PASSED TO
8368                                          ;CONT. IF NO ERRORS ARE DETECTED THEN DIVDSUB RETURNS CONTROL
8369                                          ;TO CONT.
8370
8371  043154  012601                          DIVDSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
8372  043156  012700  000200                          MOV     #200,R0         ;SET FD MODE.
8373  043162  170100                                  LDFPS   R0
8374
8375  043164  010100                                  MOV     R1,R0           ;SET UP THE AC0 OPERAND.
8376  043166  172410                                  LDD     (R0),AC0
8377  043170  016100  000030                          MOV     30(R1),R0       ;LOAD THE FPS.
8378  043174  170100                                  LDFPS   R0
8379
8380  043176  012737  043212  001236                  MOV     #1$,@#$TMP2
8381  043204  010100                                  MOV     R1,R0           ;ESTABLISH A POINTER TO FSRC.
8382  043206  062700  000010                          ADD     #10,R0
```

```
8383
8384  043212  174410                  1$:     DIVD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
8385
8386  043214  170204                          STFPS   R4              ;GET THE FPS.
8387  043216  012700  000200                  MOV     #200,R0         ;SET FD MODE.
8388  043222  170100                          LDFPS   R0
8389
8390  043224  012700  043404                  MOV     #DIVDT,R0       ;GET THE RESULT.
8391  043230  174010                          STD     AC0,(R0)
8392
8393  043232  010102                          MOV     R1,R2           ;SAVE DATA IN CASE OF ERROR.
8394  043234  010237  001240                  MOV     R2,@#$TMP3
8395  043240  062702  000010                  ADD     #10,R2
8396  043244  010237  001242                  MOV     R2,@#$TMP4
8397  043250  062702  000010                  ADD     #10,R2
8398  043254  010237  001244                  MOV     R2,@#$TMP5
8399  043260  012737  043404  001246          MOV     #DIVDT,@#$TMP6
8400  043266  010437  001250                  MOV     R4,@#$TMP7
8401  043272  016137  000032, 001252         MOV     32(R1),@#$TMP10
8402
8403  043300  010102                          MOV     R1,R2           ;CHECK THE RESULT.
8404  043302  062702  000020                  ADD     #20,R2
8405  043306  012703  043404                  MOV     #DIVDT,R3
8406  043312  012705  000004                  MOV     #4,R5
8407  043316  022223                  2$:     CMP     (R2)+,(R3)+
8408  043320  001006                          BNE     10$             ;BRANCH IF RESULT INCORRECT.
8409  043322  077503                          SOB     R5,2$
8410
8411  043324  026104  000032                  CMP     32(R1),R4       ;IS FPS CORRECT?
8412  043330  001023                          BNE     15$             ;BRANCH IF INCORRECT.
8413  043332  000161  000046                  JMP     46(R1)          ;RETURN.
8414
8415  043336  010102                  10$:    MOV     R1,R2           ;WAS INCORRECT RESULT ANTICIPATED?
8416  043340  062702  000034                  ADD     #34,R2
8417  043344  012703  043404                  MOV     #DIVDT,R3
8418  043350  012705  000004                  MOV     #4,R5
8419  043354  022223                  11$:    CMP     (R2)+,(R3)+
8420  043356  001005                          BNE     12$             ;BRANCH IF NO.
8421  043360  077503                          SOB     R5,11$
8422  043362  010102                          MOV     R1,R2           ;IF THE INCORRECT RESULT WAS
8423  043364  062702  000044                  ADD     #44,R2          ;ANTICIPATED RETURN TO THE
8424                                                                  ;ERROR REPORT IN THE CALLING
8425  043370  000112                          JMP     (R2)            ;ROUTINE.
8426
8427  043372                          12$:                            ;REPORT RESULT INCORRECT.
8428  043372  104002                  13$:    ERROR   2
8429  043374  000161  000046          14$:    JMP     46(R1)
8430
8431  043400                          15$:                            ;REPORT FPS INCORRECT.
8432  043400  104002                  16$:    ERROR   2
8433  043402  000774                          BR      14$
8434
8435  043404  000000  000000  000000  DIVDT:  .WORD   0,0,0,0
8436  043412  000000
8437
8438  043414                          DDDDONE:
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8439  043414  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
8440                                                                  ;SEE IF THE USER HAS EXPRESSED
8441                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
8442                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
8443                                                                  ;THE USER TYPED CONTROL G?).
8444
8445
8446
8447                                  ;;*****************************************************************
8448                                  ;*TEST 46       MULF TEST
8449                                  ;*
8450                                  ;*THIS IS A TEST OF THE MULF INSTRUCTION. IT MAKES USE OF A SUBROUTINE
8451                                  ;*TO SET UP THE OPERANDS, EXECUTE THE MULF INSTRUCTION AND CHECK THE
8452                                  ;*RESULTS.
8453                                  ;*
8454                                  ;;*****************************************************************
8455  043416  000004                  TST46:  SCOPE
8456
8457                                  ;MULF WITH (FSRC=AC=0)
8458  043420                          EEE1:
8459  043420  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8460  043422  004737  044200                  JSR     PC,@#MULFSUB
8461  043426  000000  000000          1$:     .WORD   0,0             ;AC
8462  043432  000000  000000          2$:     .WORD   0,0             ;FSRC
8463  043436  000000  000000          3$:     .WORD   0,0             ;RES
8464  043442  007517                  4$:     7517                    ;FPS BEFORE EXECUTION.
8465  043444  007504                          7504                    ;FPS AFTER EXECUTION.
8466  043446  177777  177777          5$:     .WORD   -1,-1
8467  043452  104002                  6$:     ERROR   2
8468
8469                                  ;MULF WITH (FSRC=0).
8470  043454                          EEE2:
8471  043454  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8472  043456  004737  044200                  JSR     PC,@#MULFSUB
8473  043462  071625  034435          1$:     .WORD   71625,34435     ;AC
8474  043466  000000  000000          2$:     .WORD   0,0             ;FSRC
8475  043472  000000  000000          3$:     .WORD   0,0             ;RES
8476  043476  000013                  4$:     13                      ;FPS BEFORE EXECUTION.
8477  043500  000004                          4                       ;FPS AFTER EXECUTION.
8478  043502  177777  177777          5$:     .WORD   -1,-1           ;ERROR RES.
8479  043506  104002                  6$:     ERROR   2
8480
8481                                  ;MULF WITH (AC=0)
8482  043510                          EEE3:
8483  043510  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8484  043512  004737  044200                  JSR     PC,@#MULFSUB
8485  043516  000000  000000          1$:     .WORD   0,0             ;AC
8486  043522  071625  153443          2$:     .WORD   071625,153443   ;FSRC
8487  043526  000000  000000          3$:     .WORD   0,0             ;RES
8488  043532  007500                  4$:     7500                    ;FPS BEFORE EXECUTION.
8489  043534  007504                          7504                    ;FPS AFTER EXECUTION.
8490  043536  177777  177777          5$:     .WORD   -1,-1           ;ERROR RES.
8491  043542  104002                  6$:     ERROR   2
8492
8493                                  ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN ROUND MODE.
8494  043544                          EEE4:
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 8495  043544  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 8496  043546  004737  044200                  JSR     PC,@#MULFSUB
 8497  043552  040200  000000          1$:     .WORD   40200,0                 ;AC
 8498  043556  040177  177777          2$:     .WORD   40177,-1                ;FSRC
 8499  043562  040177  177777          3$:     .WORD   40177,-1                ;RES
 8500  043566  000017                  4$:     17                              ;FPS BEFORE EXECUTION.
 8501  043570  000000                          0                               ;FPS AFTER EXECUTION.
 8502  043572  140177  177777          5$:     .WORD   140177,-1               ;ERROR RES.
 8503  043576  104002                  6$:     ERROR   2                       ;BAD SIGN.
 8504
 8505                                  ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN TRUNCATE MODE.
 8506  043600                          EEE5:
 8507  043600  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 8508  043602  004767  000372                  JSR     PC,MULFSUB
 8509  043606  040177  177777          1$:     .WORD   40177,-1                ;AC
 8510  043612  040200  000000          2$:     .WORD   40200,0                 ;FSRC
 8511  043616  040177  177777          3$:     .WORD   40177,-1                ;RES
 8512  043622  000040                  4$:     40                              ;FPS BEFORE EXECUTION.
 8513  043624  000040                          40                              ;FPS AFTER EXECUTION.
 8514  043626  037777  177777          5$:     .WORD   37777,-1                ;ERROR RES.
 8515  043632  104002                  6$:     ERROR   2                       ;ST 252 TO 044 INTO 444 (BUT Y62)
 8516                                                                          ;MUL. NORMALIZATION FAILURE.
 8517
 8518                                  ;MULF WITH BOTH OPERANDS POSITIVE NORMALIZE TEST.
 8519  043634                          EEE6:
 8520  043634  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 8521  043636  004737  044200                  JSR     PC,@#MULFSUB
 8522  043642  040100  000000          1$:     .WORD   40100,0                 ;AC
 8523  043646  040100  000000          2$:     .WORD   40100,0                 ;FSRC
 8524  043652  040020  000000          3$:     .WORD   40020,0                 ;RES
 8525  043656  000012                  4$:     12                              ;FPS BEFORE EXECUTION.
 8526  043660  000000                          0                               ;FPS AFTER EXECUTION.
 8527  043662  042040  000000          5$:     .WORD   42040,0                 ;ERROR RES.
 8528  043666  104002                  6$:     ERROR   2                       ;ST 252 TO 444 INTO 042 (BUT Y62)
 8529                                                                          ;MUL. NORMALIZATION FAILURE.
 8530
 8531                                  ;MULF WITH BOTH OPERANDS POSITIVE IN ROUND MODE.
 8532  043670                          EEE7:
 8533  043670  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 8534  043672  004737  044200                  JSR     PC,@#MULFSUB
 8535  043676  017500  000000          1$:     .WORD   17500,0                 ;AC
 8536  043702  023652  125252          2$:     .WORD   23652,125252            ;FSRC
 8537  043706  003177  177777          3$:     .WORD   3177,-1                 ;RES
 8538  043712  007417                  4$:     7417                            ;FPS BEFORE EXECUTION.
 8539  043714  007400                          7400                            ;FPS AFTER EXECUTION.
 8540  043716  177777  177777          5$:     .WORD   -1,-1
 8541  043722  104002                  6$:     ERROR   2
 8542
 8543                                  ;MULF WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
 8544  043724                          EEE8:
 8545  043724  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 8546  043726  004737  044200                  JSR     PC,@#MULFSUB
 8547  043732  040342  000000          1$:     .WORD   40342,0                 ;AC
 8548  043736  176542  000000          2$:     .WORD   176542,0                ;FSRC
 8549  043742  176707  102000          3$:     .WORD   176707,102000           ;RES
 8550  043746  000007                  4$:     7                               ;FPS BEFORE EXECUTION.
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8551  043750  000010                    10                      ;FPS AFTER EXECUTION.
8552  043752  076507  102000    7$:     .WORD   76507,102000    ;ERROR RES.
8553  043756  104002              6$:   ERROR   2               ;BAD SIGN.
8554
8555                              ;MULF WITH AC NEGATIVE AND FSRC POSITIVE IN ROUND MODE.
8556  043760                    EEE9:
8557  043760  104414                    LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8558  043762  004737  044200            JSR     PC,@#MULFSUB
8559  043766  140200  000000    1$:     .WORD   140200,0        ;AC
8560  043772  007417  007417    2$:     .WORD   7417,7417       ;FSRC
8561  043776  107417  007417    3$:     .WORD   107417,7417     ;RES
8562  044002  000000              4$:   0                       ;FPS BEFORE EXECUTION.
8563  044004  000010                    10                      ;FPS AFTER EXECUTION.
8564  044006  007417  007417    5$:     .WORD   7417,7417       ;ERROR RES.
8565  044012  104002              6$:   ERROR   2               ;BAD SIGN.
8566
8567                              ;MULF WITH BOTH OPERANDS NEGATIVE IN ROUND MODE.
8568  044014                    EEE10:
8569  044014  104414                    LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8570  044016  004737  044200            JSR     PC,@#MULFSUB
8571  044022  144600  000000    1$:     .WORD   144600,0        ;AC
8572  044026  154000  000000    2$:     .WORD   154000,0        ;FSRC
8573  044032  060400  000000    3$:     .WORD   60400,0         ;RES
8574  044036  000017              4$:   17                      ;FPS BEFORE EXECUTION.
8575  044040  000000                    0                       ;FPS AFTER EXECUTION.
8576  044042  160400  000000    5$:     .WORD   160400,0        ;ERROR RES.
8577  044046  104002              6$:   ERROR   2               ;BAD SIGN.
8578
8579                              ;MULF BOTH OPERANDS NEGATIVE IN ROUND MODE.
8580  044050                    EEE11:
8581  044050  104414                    LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8582  044052  004737  044200            JSR     PC,@#MULFSUB
8583  044056  140300  000000    1$:     .WORD   140300,0        ;AC
8584  044062  160000  000001    2$:     .WORD   160000,1        ;FSRC
8585  044066  060100  000002    3$:     .WORD   60100,2         ;RES
8586  044072  000010              4$:   10                      ;FPS BEFORE EXECUTION.
8587  044074  000000                    0                       ;FPS AFTER EXECUTION.
8588  044076  060100  000001    5$:     .WORD   60100,1         ;ERROR RES.
8589  044102  104002              6$:   ERROR   2               ;ROUND FAILURE.
8590
8591                              ;MULF WITH AC POSITIVE AND FSRC NEGATIVE IN TRUNCATE MODE.
8592  044104                    EEE12:
8593  044104  104414                    LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8594  044106  004737  044200            JSR     PC,@#MULFSUB
8595  044112  060000  000001    1$:     .WORD   60000,1         ;AC
8596  044116  140300  000000    2$:     .WORD   140300,0        ;FSRC
8597  044122  160100  000001    3$:     .WORD   160100,1        ;RES
8598  044126  007547              4$:   7547                    ;FPS BEFORE EXECUTION.
8599  044130  007550                    7550                    ;FPS AFTER EXECUTION.
8600  044132  160100  000001    5$:     .WORD   160100,1        ;ERROR RES.
8601  044136  104002              6$:   ERROR   2               ;TRUNCATION ERROR.
8602
8603                              ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN ROUND MODE.
8604  044140                    EEE13:
8605  044140  104414                    LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
8606  044142  004737  044200            JSR     PC,@#MULFSUB
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```
 8607  044146  040277  000000          1$:     .WORD   40277,0          ;AC
 8608  044152  060000  000001          2$:     .WORD   60000,1          ;FSRC
 8609  044156  060077  000001          3$:     .WORD   60077,1          ;RES
 8610  044162  000014                  4$:     14                       ;FPS BEFORE EXECUTION.
 8611  044164  000000                          0                        ;FPS AFTER EXECUTION.
 8612  044166  060077  000002          5$:     .WORD   60077,2          ;ERROR RES.
 8613  044172  104002                  6$:     ERROR   2                ;ROUND FAILURE. CONSTANT BAD.
 8614
 8615  044174  000167  000224                  JMP     EEEDONE          ;GO TO THE NEXT TEST.
 8616
 8617                                  ;THIS SUBROUTINE, MULFSUB, IS CALLED TO SET UP, EXECUTE
 8618                                  ;AND CHECK THE RESULT OF A MULF INSTRUCTION. IT IS CALLED THUS:
 8619                                  ;
 8620                                  ;               JSR     PC,@#MULFSUB
 8621                                  ;       ACARG:  .WORD   X,X                      ;AC OPERAND
 8622                                  ;       FSRCARG:.WORD   X,X                      ;FSRC OPERAND
 8623                                  ;       RES:    .WORD   X,X                      ;EXPECTED RESULT
 8624                                  ;       FPSB:   .WORD   X                        ;FPS BEFORE EXECUTION
 8625                                  ;       FPSA:   .WORD   X                        ;FPS AFTER EXECUTION
 8626                                  ;       ERRES:  .WORD   X,X                      ;ERROR RESULT
 8627                                  ;       ERR:    ERROR   X                        ;RESULT ERROR
 8628                                  ;       CONT:                                    ;RETURN ADDRESS
 8629                                  ;
 8630                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
 8631                                  ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, MULF IS EXECUTED.
 8632                                  ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
 8633                                  ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
 8634                                  ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
 8635                                  ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
 8636                                  ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
 8637                                  ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
 8638                                  ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
 8639                                  ;THEN THE FAILURE IS REPORTED IN MULFSUB AND CONTROL IS PASSED TO
 8640                                  ;CONT. IF NO ERRORS ARE DETECTED THEN MULFSUB RETURNS CONTROL
 8641                                  ;TO CONT.
 8642
 8643  044200  012601                  MULFSUB:        MOV     (SP)+,R1         ;GET A POINTER TO THE ARGUMENTS.
 8644  044202  012700  000200                  MOV     #200,R0          ;SET FD MODE.
 8645  044206  170100                          LDFPS   R0
 8646  044210  010100                          MOV     R1,R0            ;LOAD THE AC OPERAND.
 8647  044212  172410                          LDD     (R0),AC0
 8648  044214  016100  000014                  MOV     14(R1),R0        ;LOAD THE FPS
 8649  044220  170100                          LDFPS   R0
 8650  044222  012737  044236  001236          MOV     #1$,@#$TMP2
 8651  044230  010100                          MOV     R1,R0
 8652  044232  062700  000004                  ADD     #4,R0            ;ESTABLISH A POINTER TO FSRC.
 8653
 8654  044236  171010                  1$:     MULF    (R0),AC0         ;TEST INSTRUCTION.
 8655
 8656  044240  170204                          STFPS   R4               ;GET THE FPS.
 8657  044242  012700  000200                  MOV     #200,R0          ;SET FD MODE
 8658  044246  170100                          LDFPS   R0
 8659
 8660  044250  012700  044414                  MOV     #MULFT,R0        ;GET THE RESULT OF THE MULF.
 8661  044254  174010                          STD     AC0,(R0)
 8662
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 8663  044256  010102                          MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
 8664  044260  010237  001240                  MOV     R2,@#$TMP3
 8665  044264  062702  000004                  ADD     #4,R2
 8666  044270  010237  001242                  MOV     R2,@#$TMP4
 8667  044274  062702  000004                  ADD     #4,R2
 8668  044300  010237  001244                  MOV     R2,@#$TMP5
 8669  044304  012737  044414  001246          MOV     #MULFT,@#$TMP6
 8670  044312  010437  001250                  MOV     R4,@#$TMP7
 8671  044316  016137  000016  001252          MOV     16(R1),@#$TMP10
 8672
 8673  044324  021061  000010                  CMP     (R0),10(R1)     ;IS THE RESULT CORRECT?
 8674  044330  001011                          BNE     10$             ;IF INCORRECT BRANCH.
 8675  044332  026061  000002  000012          CMP     2(R0),12(R1)
 8676  044340  001005                          BNE     10$
 8677
 8678  044342  026104  000016                  CMP     16(R1),R4       ;IS FPS CORRECT?
 8679  044346  001020                          BNE     15$             ;IF INCORRECT BRANCH.
 8680  044350  000161  000026                  JMP     26(R1)          ;IF NO ERRORS OCCURRED RETURN.
 8681
 8682  044354  021061  000020          10$:    CMP     (R0),20(R1)     ;DOES THE INCORRECT RESULT
 8683  044360  001010                          BNE     11$             ;MATCH THE ANTICIPATED INCORRECT RESULT.
 8684  044362  026061  000002  000022          CMP     2(R0),22(R1)
 8685  044370  001004                          BNE     11$             ;BRANCH IF NO.
 8686
 8687  044372  010102                          MOV     R1,R2           ;IT MATCHED SO RETURN TO THE ERROR
 8688                                                                  ;REPORT AT THE CALLING ROUTINE.
 8689  044374  062702  000024                  ADD     #24,R2
 8690  044400  000112                          JMP     (R2)
 8691
 8692  044402                          11$:                            ;REPORT RESULT INCORRECT.
 8693  044402  104002                  12$:    ERROR   2
 8694  044404  000161  000026          13$:    JMP     26(R1)
 8695
 8696  044410                          15$:                            ;REPORT FPS INCORRECT.
 8697  044410  104002                  16$:    ERROR   2
 8698  044412  000774                          BR      13$
 8699
 8700  044414  000000  000000  000000  MULFT:  .WORD   0,0,0,0
 8701  044422  000000
 8702
 8703  044424                          EEEDONE:
 8704  044424  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 8705                                                                  ;SEE IF THE USER HAS EXPRESSED
 8706                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
 8707                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 8708                                                                  ;THE USER TYPED CONTROL G?).
 8709
 8710
 8711
 8712                                  ;;*****************************************************************
 8713                                  ;*TEST 47       MULD TEST
 8714                                  ;*
 8715                                  ;*THIS IS A TEST OF THE MULD INSTRUCTION. NOTE THAT A SUBROUTINE IS
 8716                                  ;*USED TO SET UP THE OPERANDS, EXECUTE THE MULD INSTRUCTION AND
 8717                                  ;*CHECK THE RESULTS.
 8718                                  ;*
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 8719                                   ;;*****************************************************************
 8720  044426  000004                   TST47:  SCOPE
 8721
 8722                                   ;MULD TEST WITH AC POSITIVE AND FSRC POSITIVE.
 8723  044430                           FFF1:
 8724  044430  104414                           LPERR                          ;SET UP THE LOOP ON ERROR ADDRESS.
 8725  044432  004737  044714                   JSR     PC,@#MULDSUB
 8726  044436  040200  000000  000000  1$:      .WORD   40200,0,0,0            ;AC
 8727  044444  000000
 8728  044446  023777  177777  177777  2$:      .WORD   23777,-1,-1,-1         ;FSRC
 8729  044454  177777
 8730  044456  023777  177777  177777  3$:      .WORD   23777,-1,-1,-1         ;RES
 8731  044464  177777
 8732  044466  000217                   4$:      217                            ;FPS BEFORE EXECUTION.
 8733  044470  000200                            200                            ;FPS AFTER ECECUTION.
 8734  044472  023777  177777  000000  5$:      .WORD   23777,-1,0,0           ;ERROR RES.
 8735  044500  000000
 8736  044502  104002                   6$:      ERROR   2                      ;BAD CONSTANT USED IN ALGORITHM
 8737                                                                           ;USED 24 INSTEAD OF 56.
 8738
 8739                                   ;MULD TEST WITH BOTH OPERANDS POSITIVE TRUNCATION TEST.
 8740  044504                           FFF2:
 8741  044504  104414                           LPERR                          ;SET UP THE LOOP ON ERROR ADDRESS.
 8742  044506  004767  000202                   JSR     PC,MULDSUB
 8743  044512  065400  000000  000000  1$:      .WORD   65400,0,0,1            ;AC
 8744  044520  000001
 8745  044522  037577  177777  177777  2$:      .WORD   37577,-1,-1,-2         ;FSRC
 8746  044530  177776
 8747  044532  064777  177777  177777  3$:      .WORD   64777,-1,-1,-1         ;RES
 8748  044540  177777
 8749  044542  000247                   4$:      247                            ;FPS BEFORE EXECUTION.
 8750  044544  000240                            240                            ;FPS AFTER EXECUTION.
 8751  044546  065000  000000  000000  5$:      .WORD   65000,0,0,0            ;ERROR RES.
 8752  044554  000000
 8753  044556  104002                   6$:      ERROR   2                      ;TRUNCATION ERROR.
 8754
 8755                                   ;MULD TEST WITH BOTH OPERANDS NEGATIVE IN ROUND MODE.
 8756  044560                           FFF3:
 8757  044560  104414                           LPERR                          ;SET UP THE LOOP ON ERROR ADDRESS.
 8758  044562  004737  044714                   JSR     PC,@#MULDSUB
 8759  044566  137577  177777  177777  1$:      .WORD   137577,-1,-1,-2        ;AC
 8760  044574  177776
 8761  044576  165400  000000  000000  2$:      .WORD   165400,0,0,1           ;FSRC
 8762  044604  000001
 8763  044606  065000  000000  000000  3$:      .WORD   65000,0,0,0            ;RES
 8764  044614  000000
 8765  044616  007717                   4$:      7717                           ;FPS BEFORE EXECUTION.
 8766  044620  007700                            7700                           ;FPS AFTER EXECUTION.
 8767  044622  064777  177777  177777  5$:      .WORD   64777,-1,-1,-1         ;ERROR RES.
 8768  044630  177777
 8769  044632  104002                   6$:      ERROR   2                      ;ROUND ERROR.
 8770
 8771                                   ;MULD   TEST WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
 8772  044634                           FFF4:
 8773  044634  104414                           LPERR                          ;SET UP THE LOOP ON ERROR ADDRESS.
 8774  044636  004737  044714                   JSR     PC,@#MULDSUB
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 8775  044642  017500  000000  000000  1$:     .WORD   17500,0,0,0     ;AC
 8776  044650  000000
 8777  044652  123652  125252          2$:     .WORD   123652,125252   ;FSRC
 8778  044656  125252  125252                  .WORD   125252,125252
 8779  044662  103177  177777  177777  3$:     .WORD   103177,-1,-1,-1 ;RES
 8780  044670  177777
 8781  044672  000200                  4$:     200                     ;FPS BEFORE EXECUTION.
 8782  044674  000210                          210                     ;FPS AFTER EXECUTION.
 8783  044676  103200  000000  000000  5$:     .WORD   103200,0,0,0    ;ERROR RES.
 8784  044704  000000
 8785  044706  104002                  6$:     ERROR   2               ;ROUND ERROR (BAD CONSTANT).
 8786
 8787  044710  000167  000240                  JMP     FFFDONE
 8788
 8789                                  ;THIS SUBROUTINE, MULDSUB, IS CALLED TO SET UP, EXECUTE
 8790                                  ;AND CHECK THE RESULT OF A MULD INSTRUCTION. IT IS CALLED THUS:
 8791                                  ;
 8792                                  ;               JSR     PC,@#MULDSUB
 8793                                  ;       ACARG:  .WORD   X,X,X,X                 ;AC OPERAND
 8794                                  ;       FSRCARG:.WORD   X,X,X,X                 ;FSRC OPERAND
 8795                                  ;       RES:    .WORD   X,X,X,X                 ;EXPECTED RESULT
 8796                                  ;       FPSB:   .WORD   X                       ;FPS BEFORE EXECUTION
 8797                                  ;       FPSA:   .WORD   X                       ;FPS AFTER EXECUTION
 8798                                  ;       ERRES:  .WORD   X,X,X,X                 ;ERROR RESULT
 8799                                  ;       ERR:    ERROR   X                       ;RESULT ERROR
 8800                                  ;       CONT:                                   ;RETURN ADDRESS
 8801                                  ;
 8802                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
 8803                                  ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, MULD IS EXECUTED.
 8804                                  ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
 8805                                  ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
 8806                                  ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
 8807                                  ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
 8808                                  ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
 8809                                  ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
 8810                                  ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
 8811                                  ;THEN THE FAILURE IS REPORTED IN MULDSUB AND CONTROL IS PASSED TO
 8812                                  ;CONT. IF NO ERRORS ARE DETECTED THEN MULDSUB RETURNS CONTROL
 8813                                  ;TO CONT.
 8814
 8815  044714  012601                  MULDSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
 8816  044716  012700  000200                  MOV     #200,R0         ;SET FD MODE.
 8817  044722  170100                          LDFPS   R0
 8818
 8819  044724  010100                          MOV     R1,R0           ;SET UP THE AC0 OPERAND.
 8820  044726  172410                          LDD     (R0),AC0
 8821  044730  016100  000030                  MOV     30(R1),R0       ;LOAD THE FPS.
 8822  044734  170100                          LDFPS   R0
 8823
 8824  044736  012737  044752  001236          MOV     #1$,@#$TMP2
 8825  044744  010100                          MOV     R1,R0           ;ESTABLISH A POINTER TO FSRC.
 8826  044746  062700  000010                  ADD     #10,R0
 8827
 8828  044752  171010                  1$:     MULD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
 8829
 8830  044754  170204                          STFPS   R4              ;GET THE FPS.
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8831  044756  012700  000200              MOV     #200,R0         ;SET FD MODE.
8832  044762  170100                      LDFPS   R0
8833
8834  044764  012700  045144              MOV     #MULDT,R0       ;GET THE RESULT.
8835  044770  174010                      STD     AC0,(R0)
8836
8837  044772  010102                      MOV     R1,R2           ;SAVE DATA IN CASE OF ERROR.
8838  044774  010237  001240              MOV     R2,@#$TMP3
8839  045000  062702  000010              ADD     #10,R2
8840  045004  010237  001242              MOV     R2,@#$TMP4
8841  045010  062702  000010              ADD     #10,R2
8842  045014  010237  001244              MOV     R2,@#$TMP5
8843  045020  012737  045144  001246      MOV     #MULDT,@#$TMP6
8844  045026  010437  001250              MOV     R4,@#$TMP7
8845  045032  016137  000032  001252      MOV     32(R1),@#$TMP10
8846
8847  045040  010102                      MOV     R1,R2           ;CHECK THE RESULT.
8848  045042  062702  000020              ADD     #20,R2
8849  045046  012703  045144              MOV     #MULDT,R3
8850  045052  012705  000004              MOV     #4,R5
8851  045056  022223              2$:     CMP     (R2)+,(R3)+
8852  045060  001006                      BNE     10$             ;BRANCH IF RESULT INCORRECT.
8853  045062  077503                      SOB     R5,2$
8854
8855  045064  026104  000032              CMP     32(R1),R4       ;IS FPS CORRECT?
8856  045070  001023                      BNE     15$             ;BRANCH IF INCORRECT.
8857  045072  000161  000046              JMP     46(R1)          ;RETURN.
8858
8859  045076  010102              10$:    MOV     R1,R2           ;WAS INCORRECT RESULT ANTICIPATED?
8860  045100  062702  000034              ADD     #34,R2
8861  045104  012703  045144              MOV     #MULDT,R3
8862  045110  012705  000004              MOV     #4,R5
8863  045114  022223              11$:    CMP     (R2)+,(R3)+
8864  045116  001005                      BNE     12$             ;BRANCH IF NO.
8865  045120  077503                      SOB     R5,11$
8866  045122  010102                      MOV     R1,R2           ;IF THE INCORRECT RESULT WAS
8867  045124  062702  000044              ADD     #44,R2          ;ANTICIPATED RETURN TO THE
8868                                                              ;ERROR REPORT IN THE CALLING
8869  045130  000112                      JMP     (R2)            ;ROUTINE.
8870
8871  045132                      12$:                            ;REPORT RESULT INCORRECT.
8872  045132  104002              13$:    ERROR   2
8873  045134  000161  000046      14$:    JMP     46(R1)
8874
8875  045140                      15$:                            ;REPORT FPS INCORRECT.
8876  045140  104002              16$:    ERROR   2
8877  045142  000774                      BR      14$
8878
8879  045144  000000  000000  000000  MULDT:  .WORD   0,0,0,0
8880  045152  000000
8881
8882  045154                      FFFDONE:
8883  045154  104413                      RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
8884                                                              ;SEE IF THE USER HAS EXPRESSED
8885                                                              ;THE DESIRE TO CHANGE THE SOFTWARE
8886                                                              ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
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                                                        ;THE USER TYPED CONTROL G?).



                                ;;*****************************************************************
                                ;*TEST 50        UNDER\OVER FLOW, USING MULF WITH TRAPS DISABLED, TEST
                                ;*
                                ;*THIS IS A TEST OF THE OVERFLOW AND UNDERFLOW CONDITIONS USING
                                ;*THE MULF INSTRUCTION WITH TRAPS DISABLED. NOTE THAT A SUBROUTINE
                                ;*IS USED TO SET UP THE OPERANDS, EXECUTE THE MULF INSTRUCTION AND
                                ;*CHECK THE RESULTS.
                                ;*
                                ;;*****************************************************************
045156  000004                TST50:  SCOPE

                                ;UNDERFLOW, WITH EXPONENT OF RESULT = -129
045160                          1111:
045160  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
045162  004737  045404                JSR     PC,@#OVUNFNT
045166  020200  000000        1$:     .WORD   20200,0         ;AC
045172  020000  000000        2$:     .WORD   20000,0         ;FSRC
045176  000000  000000        3$:     .WORD   0,0             ;RES
045202  177777  177777        4$:     .WORD   -1,-1           ;ERROR RES.
045206  000000                5$:     0                       ;FPS BEFORE EXECUTION.
045210  000004                        4                       ;FPS AFTER EXECUTION.
045212  000012                6$:     12                      ;FEC
045214  177777                        -1                      ;FLAG
045216  104002                7$:     ERROR   2               ;ST 331 TO 155 INTO 115 (BUT FIU)
045220  000401                        BR      8$
045222  104002                        ERROR   2
045224                          8$:

                                ;UNDERFLOW, WITH EXPONENT OF RESULT = -193
045224                          1112:
045224  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
045226  004737  045404                JSR     PC,@#OVUNFNT
045232  010200  000000        1$:     .WORD   10200,0         ;AC
045236  010000  000000        2$:     .WORD   10000,0         ;FSRC
045242  000000  000000        3$:     .WORD   0,0             ;RES
045246  010000  000000        4$:     .WORD   10000,0         ;ERROR RES.
045252  005013                5$:     5013                    ;FPS BEFORE EXECUTION.
045254  005004                        5004                    ;FPS AFTER EXECUTION.
045256  000012                6$:     12                      ;FEC
045260  177777                        -1                      ;FLAG
045262  104002                7$:     ERROR   2               ;SETTING FIUV OR FIV CAUSES TRAP
                                                              ;WITH FIU CLEAR.
045264  000401                        BR      8$
045266  104002                        ERROR   2
045270                          8$:

                                ;OVERFLOW, EXPONENT OF RESULT = 128
045270                          1113:
045270  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
045272  004737  045404                JSR     PC,@#OVUNFNT
045276  060200  000000        1$:     .WORD   60200,0         ;AC
045302  060000  000000        2$:     .WORD   60000,0         ;FSRC
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 8943  045306  000000  000000          3$:     .WORD   0,0             ;RES
 8944  045312  060000  000000          4$:     .WORD   60000,0         ;ERROR RES.
 8945  045316  000000                  5$:     0                       ;FPS BEFORE EXECUTION.
 8946  045320  000006                          6                       ;FPS AFTER EXECUTION.
 8947  045322  000010                  6$:     10                      ;FEC
 8948  045324  000000                          0                       ;FLAG
 8949  045326  104002                  7$:     ERROR   2               ;ST 333 TO 136 INTO 116 (BUT FIV).
 8950  045330  000401                          BR      8$
 8951  045332  104002                          ERROR   2
 8952  045334                          8$:
 8953
 8954                                  ;OVERFLOW, EXPONENT OF RESULT = 130
 8955  045334                          III4:
 8956  045334  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 8957  045336  004737  045404                  JSR     PC,@#OVUNFNT
 8958  045342  060200  000000          1$:     .WORD   60200,0         ;AC
 8959  045346  060200  000000          2$:     .WORD   60200,0         ;FSRC
 8960  045352  000000  000000          3$:     .WORD   0,0             ;RES
 8961  045356  177777  177777          4$:     .WORD   -1,-1           ;ERROR RES.
 8962  045362  006011                  5$:     6011                    ;FPS BEFORE EXECUTION.
 8963  045364  006006                          6006                    ;FPS AFTER EXECUTION.
 8964  045366  000010                  6$:     10                      ;FEC
 8965  045370  000000                          0                       ;FLAG
 8966  045372  104002                  7$:     ERROR   2               ;SETTING FIUV OR FIU WITH
 8967                                                                  ;FIV CLEAR CAUSES TRAP.
 8968  045374  000401                          BR      8$
 8969  045376  104002                          ERROR   2
 8970  045400  000167  000410          8$:     JMP     IIIDONE         ;GO TO NEXT TEST.
 8971
 8972
 8973
 8974                                  ;THIS SUBROUTINE, OVUNFNT, IS USED TO SET UP THE OPERANDS, EXECUTE
 8975                                  ;THE MULF INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
 8976                                  ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
 8977                                  ;TO IT IS MADE THUS:
 8978                                  ;
 8979                                  ;               ACARG:   .WORD   X,X            ;AC OPERAND
 8980                                  ;               FSRCARG:.WORD    X,X            ;FSRC OPERAND
 8981                                  ;               RES:     .WORD   X,X            ;EXPECTED RESULT
 8982                                  ;               ERRES:   .WORD   X,X            ;ERROR RESULT
 8983                                  ;               FPSB:    .WORD   X              ;FPS BEFORE EXECUTION
 8984                                  ;               FPSA:    .WORD   X              ;FPS AFTER EXECUTION
 8985                                  ;               FEC:     .WORD   X              ;EXPECTED FEC
 8986                                  ;               FLAG:    .WORD   X              ;0/-1,OVER/UNDER FLOW FLAG
 8987                                  ;               ERR1:    ERROR   X              ;TRAP ERROR.
 8988                                  ;               BR       CONT
 8989                                  ;               ERR2:    ERROR   X              ;DATA, RESULT ERROR
 8990                                  ;               CONT:                           ;RETURN ADDRESS
 8991                                  ;
 8992                                  ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
 8993                                  ;THE MULF INSTRUCTION IS EXECUTED. IF NO TRAP OCCURS THEN THE
 8994                                  ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
 8995                                  ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNFNT RETURNS CONTROL
 8996                                  ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNFNT
 8997                                  ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
 8998                                  ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
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                                        ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
                                        ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNFNT
                                        ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
                                        ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNFNT WILL
                                        ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
                                        ;IF A TRAP OCCURS (IT SHOULD NOT) THEN OVUNFNT WILL READ THE FEC.
                                        ;SHOULD THE FEC MATCH THE ANTICIPATED FEC OVUNFNT WILL
                                        ;STORE ALL DATA AND TRANSFER CONTROL TO THE ERROR CALL AT ERR1. IF THE
                                        ;FEC IS NOT THE SAME AS THE ANTICIPATED FEC OVUNFNT WILL REPORT
                                        ;THE ERROR AND RETURN TO CONT. NOTE THAT OVUNFNT USES THE FLAG
                                        ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
                                        ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).

045404  012601                  OVUNFNT:      MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
045406  012700  000200                 MOV     #200,R0         ;SET FD MODE.
045412  170100                       LDFPS   R0

045414  010100                       MOV     R1,R0           ;LOAD AC0, OPERAND.
045416  172410                       LDD     (R0),AC0

045420  010102                       MOV     R1,R2           ;SAVE THE DATA PATTERNS IN CASE OF
045422  010237  001240               MOV     R2,@#$TMP3      ;ERROR.
045426  062702  000004               ADD     #4,R2
045432  010237  001242               MOV     R2,@#$TMP4
045436  062702  000004               ADD     #4,R2
045442  010237  001244               MOV     R2,@#$TMP5
045446  016137  000022  001252       MOV     22(R1),@#$TMP10
045454  012737  046004  001246       MOV     #OVFNTT,@#$TMP6

045462  016100  000020               MOV     20(R1),R0       ;LOAD THE FPS.
045466  170100                       LDFPS   R0
045470  012737  045512  001236       MOV     #1$,@#$TMP2
045476  012737  045676  000244       MOV     #25$,@#FPVECT   ;SET UP THE FP TRAP VECTOR IN CASE
                                                             ;OF ERROR.
045504  010100                       MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
045506  062700  000004               ADD     #4,R0

045512  171010              1$:      MULF    (R0),AC0        ;TEST INSTRUCTION.

045514  170204              2$:      STFPS   R4              ;GET FPS.
045516  170305                       STST    R5              ;GET FEC.
045520  012700  000200               MOV     #200,R0         ;SET FD MODE.
045524  170100                       LDFPS   R0
045526  012700  046004               MOV     #OVFNTT,R0      ;GET THE RESULT.
045532  174010                       STD     AC0,(R0)
045534  010437  001250               MOV     R4,@#$TMP7
045540  010537  001254               MOV     R5,@#$TMP11

045544  012700  046004               MOV     #OVFNTT,R0      ;CHECK THE RESULT.
045550  010102                       MOV     R1,R2
045552  062702  000010               ADD     #10,R2
045556  012703  000002               MOV     #2,R3
045562  022022              3$:      CMP     (R0)+,(R2)+
045564  001015                       BNE     15$             ;BRANCH IF INCORRECT.
045566  077303                       SOB     R3,3$
```

```
9055  045570  026104  000022          CMP     22(R1),R4       ;WAS FPS CORRECT?
9056  045574  001002                  BNE     10$             ;BRANCH IF FPS IS INCORRECT.
9057
9058  045576  000161  000036  4$:     JMP     36(R1)          ;RETURN, TEST COMPLETED.
9059
9060                          ;REPORT INCORRECT FPS.
9061  045602  005761  000026  10$:     TST     26(R1)          ;WAS THE RESULT OVER OR UNDER FLOW?
9062  045606  001002                  BNE     12$             ;BRANCH IF UNDERFLOW.
9063
9064                                                          ;REPORT FPS BAD AFTER OVERFLOW.
9065  045610  104002          11$:    ERROR   2
9066  045612  000771                  BR      4$
9067
9068  045614                  12$:                            ;REPORT FPS BAD AFTER UNDERFLOW.
9069  045614  104002          13$:    ERROR   2
9070  045616  000767                  BR      4$
9071
9072                          ;RESULT INCORRECT.
9073  045620  012700  046004  15$:    MOV     #OVFNTT,R0      ;SEE IF FAILURE IS ANTICIPATED
9074  045624  010102                  MOV     R1,R2           ;FAILURE.
9075  045626  062702  000014          ADD     #14,R2
9076  045632  012703  000002          MOV     #2,R3
9077  045636  022022          16$:    CMP     (R0)+,(R2)+
9078  045640  001007                  BNE     17$             ;BRANCH IF NOT ANTICIPATED.
9079  045642  077303                  SOB     R3,16$
9080
9081  045644  010102                  MOV     R1,R2           ;ERROR WAS ANTICIPATED SO RETURN
9082  045646  062702  000034          ADD     #34,R2          ;TO THE ERROR REPORT IN THE CALLING
9083  045652  010237  001236          MOV     R2,@#$TMP2      ;ROUTINE.
9084  045656  000112                  JMP     (R2)
9085
9086  045660  005761  000026  17$:    TST     26(R1)          ;RESULT WAS NOT ANTICIPATED
9087                                                          ;SO ERROR MUST BE REPORTED HERE.
9088                                                          ;FIRST SEE IF ARGUMENTS SHOULD
9089                                                          ;HAVE RESULTED IN OVERFLOW OR UNDER
9090                                                          ;FLOW BY LOOKING AT THE FLAG.
9091  045664  001002                  BNE     19$             ;BRANCH IF UNDERFLOW EXPECTED.
9092
9093                                                          ;REPORT RESULT INCORRECT, EXPECTING
9094  045666  104002          18$:    ERROR   2               ;OVERFLOW.
9095  045670  000742                  BR      4$
9096
9097  045672                  19$:                            ;REPORT RESULT INCORRECT, EXPECTING
9098  045672  104002          20$:    ERROR   2               ;UNDERFLOW.
9099  045674  000740                  BR      4$
9100
9101                          ;IF AN FP TRAP OCCURS COME HERE.
9102  045676  011602          25$:    MOV     (SP),R2         ;GET ADDRESS OF TRAP.
9103  045700  022702  045514          CMP     #2$,R2          ;WAS THE TRAP DURING THE MULF INSTRUCTION?
9104  045704  001402                  BEQ     26$             ;BRANCH IF YES.
9105  045706  000137  062534          JMP     @#FPSPUR        ;OTHERWISE GO REPORT A SPURIOUS
9106                                                          ;FP TRAP.
9107  045712  022626          26$:    CMP     (SP)+,(SP)+     ;RESET THE STACK.
9108  045714  010237  001236          MOV     R2,@#$TMP2      ;SAVE DATA FOR ERROR REPORT.
9109  045720  170204                  STFPS   R4              ;GET FPS.
9110  045722  170305                  STST    R5              ;GET FEC.
```

```
 9111  045724  012700  000200            MOV     #200,R0         ;SET FD MODE.
 9112  045730  170100                    LDFPS   R0
 9113  045732  012700  046004            MOV     #OVFNTT,R0      ;GET THE RESULT.
 9114  045736  174010                    STD     AC0,(R0)
 9115  045740  010537  001254            MOV     R5,@#$TMP11
 9116  045744  020561  000024            CMP     R5,24(R1)       ;WAS THE FEC ANTICIPATED?
 9117  045750  001004                    BNE     27$             ;BRANCH IF NOT ANTICIPATED.
 9118
 9119  045752  010102                    MOV     R1,R2           ;ERROR WAS ANTICIPATED SO
 9120  045754  062702  000030            ADD     #30,R2          ;RETURN TO THE ERROR REPORT OF THE
 9121                                                            ;CALLING ROUTINE.
 9122  045760  000112                    JMP     (R2)
 9123
 9124  045762  005761  000026    27$:    TST     26(R1)          ;THE ERROR WAS NOT ANTICIPATED SO
 9125                                                            ;IT MUST BE REPORTED HERE. FIRST SEE IF EXPECTED
 9126                                                            ;OVERFLOW OR UNDER FLOW.
 9127  045766  001003                    BNE     29$             ;BRANCH IF EXPECTING UNDERFLOW
 9128
 9129                                                            ;REPORT TRAPPED ON OVERFLOW WITH FIV=0
 9130  045770  104002            28$:    ERROR   2
 9131  045772  000161  000036            JMP     36(R1)
 9132
 9133  045776                    29$:
 9134  045776  104002            30$:    ERROR   2               ;REPORT TRAPPED ON UNDER FLOW WITH FIU=0
 9135  046000  000161  000036            JMP     36(R1)
 9136
 9137  046004  000000  000000  000000 OVFNTT: .WORD  0,0,0,0
 9138  046012  000000
 9139
 9140  046014                    IIIDONE:
 9141  046014  104413                    RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 9142                                                            ;SEE IF THE USER HAS EXPRESSED
 9143                                                            ;THE DESIRE TO CHANGE THE SOFTWARE
 9144                                                            ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 9145                                                            ;THE USER TYPED CONTROL G?).
 9146
 9147
 9148
 9149
 9150                                    ;;*****************************************************************
 9151                                    ;*TEST 51       UNDER\OVER FLOW, USING MULD WITH TRAP DISABLED, TEST
 9152                                    ;*
 9153                                    ;*THIS IS A TEST OF THE OVERFLOW AND UNDERFLOW CONDITIONS THAT CAN
 9154                                    ;*ARRISE USING THE MULD INSTRUCTION WITH TRAPS DISABLED. A SUBROUTINE IS
 9155                                    ;*USED TO SET UP THE OPERANDS, EXECUTE THE MULD INSTRUCTION AND
 9156                                    ;*CHECK THE RESULTS.
 9157                                    ;*
 9158                                    ;;*****************************************************************
 9159  046016  000004            TST51:  SCOPE
 9160
 9161                                    ;UNDERFLOW, EXPONENT OF RESULT=-129
 9162  046020                    JJJ1:
 9163  046020  104414                    LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 9164  046022  004737  046344            JSR     PC,@#OVUNDNT
 9165  046026  020200  000000    1$:     .WORD   20200,0         ;AC
 9166  046032  127272  000000            .WORD   127272,0
```

```
 9167  046036  020000  000000  000000  2$:     .WORD   20000,0,0,0      ;FSRC
 9168  046044  000000
 9169  046046  000000  000000  000000  3$:     .WORD   0,0,0,0          ;RES
 9170  046054  000000
 9171  046056  000000  000000          4$:     .WORD   0,0              ;ERROR RES.
 9172  046062  127272  000000                  .WORD   127272,0
 9173  046066  000200                  5$:     200                      ;FPS BEFORE EXECUTION.
 9174  046070  000204                          204                      ;FPS AFTER EXECUTION.
 9175  046072  000012                  6$:     12                       ;FEC
 9176  046074  177777                          -1                       ;FLAG
 9177  046076  104002                  7$:     ERROR   2                ;ST 331 TO 155 INTO 115 (BUT FIU)
 9178  046100  000401                          BR      8$
 9179  046102  104002                          ERROR   2                ;ST 115 (BUT FD)
 9180  046104                          8$:
 9181
 9182                                  ;UNDERFLOW, EXPONENT OF RESULT = -193
 9183  046104                          JJJ2:
 9184  046104  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
 9185  046106  004737  046344                  JSR     PC,@#OVUNDNT
 9186  046112  010200  000000          1$:     .WORD   10200,0          ;AC
 9187  046116  123456  000000                  .WORD   123456,0
 9188  046122  010000  000000  000000  2$:     .WORD   10000,0,0,0      ;FSRC
 9189  046130  000000
 9190  046132  000000  000000  000000  3$:     .WORD   0,0,0,0          ;RES
 9191  046140  000000
 9192  046142  000000  000000  123456  4$:     .WORD   0,0,123456,0     ;ERROR RES
 9193  046150  000000
 9194  046152  005213                  5$:     5213                     ;FPS BEFORE EXECUTION.
 9195  046154  005204                          5204                     ;FPS AFTER EXECUTION.
 9196  046156  000012                  6$:     12                       ;FEC
 9197  046160  177777                          -1                       ;FLAG
 9198  046162  104002                  7$:     ERROR   2                ;SETTING FIUV OR FIV BAD.
 9199  046164  000401                          BR      8$
 9200  046166  104002                          ERROR   2                ;ST 115 (BUT FD)
 9201  046170                          8$:
 9202
 9203                                  ;OVERFLOW, EXPONENT OF RESULT = 128
 9204  046170                          JJJ3:
 9205  046170  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
 9206  046172  004737  046344                  JSR     PC,@#OVUNDNT
 9207  046176  060200  000000          1$:     .WORD   60200,0          ;AC
 9208  046202  065432  000000                  .WORD   65432,0
 9209  046206  060000  000000  000000  2$:     .WORD   60000,0,0,0      ;FSRC
 9210  046214  000000
 9211  046216  000000  000000  000000  3$:     .WORD   0,0,0,0          ;RES
 9212  046224  000000
 9213  046226  000000  000000  065432  4$:     .WORD   0,0,65432,0      ;ERROR RES.
 9214  046234  000000
 9215  046236  000200                  5$:     200                      ;FPS BEFORE EXECUTION.
 9216  046240  000206                          206                      ;FPS AFTER EXECUTION.
 9217  046242  000010                  6$:     10                       ;FEC
 9218  046244  000000                          0                        ;FLAG
 9219  046246  104002                  7$:     ERROR   2                ;ST 333 TO 136 INTO 116 (BUT FIV)
 9220  046250  000401                          BR      8$
 9221  046252  104002                          ERROR   2                ;ST 116 (BUT FD)
 9222  046254                          8$:
```

```
9223
9224
9225                                    ;OVERFLOW, EXPONENT OF RESULT = 130
9226  046254                            JJJ4:
9227  046254  104414                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
9228  046256  004737  046344                    JSR     PC,@#OVUNDNT
9229  046262  060200  000000            1$:     .WORD   60200,0         ;AC
9230  046266  125252  000000                    .WORD   125252,0
9231  046272  060200  000000  000000    2$:     .WORD   60200,0,0,0     ;FSRC
9232  046300  000000
9233  046302  000000  000000  000000    3$:     .WORD   0,0,0,0         ;RES
9234  046310  000000
9235  046312  000000  000000  125252    4$:     .WORD   0,0,125252,0    ;ERROR RES.
9236  046320  000000
9237  046322  006211                    5$:     6211                    ;FPS BEFORE EXECUTION.
9238  046324  006206                            6206                    ;FPS AFTER EXECUTION.
9239  046326  000010                    6$:     10                      ;FEC
9240  046330  000000                            0                       ;FLAG
9241  046332  104002                    7$:     ERROR   2               ;SETTING FIUV OR FIV BAD.
9242  046334  000401                            BR      8$
9243  046336  104002                            ERROR   2               ;ST 116 (BUT FD)
9244  046340  000137  046754            8$:     JMP     @#JJJDONE       ;GO TO NEXT TEST.
9245
9246                                    ;THIS SUBROUTINE, OVUNDNT, IS USED TO SET UP THE OPERANDS, EXECUTE
9247                                    ;THE MULD INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
9248                                    ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
9249                                    ;TO IT IS MADE THUS:
9250                                    ;
9251                                    ;       ACARG:  .WORD   X,X,X,X         ;AC OPERAND
9252                                    ;       FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
9253                                    ;       RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
9254                                    ;       ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
9255                                    ;       FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
9256                                    ;       FPSA:   .WORD   X               ;FPS AFTER EXECUTION
9257                                    ;       FEC:    .WORD   X               ;EXPECTED FEC
9258                                    ;       FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
9259                                    ;       ERR1:   ERROR   X               ;TRAP ERROR.
9260                                    ;       BR      CONT
9261                                    ;       ERR2:   ERROR   X               ;DATA, RESULT ERROR
9262                                    ;       CONT:                           ;RETURN ADDRESS
9263                                    ;
9264                                    ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
9265                                    ;THE MULD INSTRUCTION IS EXECUTED. IF NO TRAP OCCURS THEN THE
9266                                    ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
9267                                    ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNDNT RETURNS CONTROL
9268                                    ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNDNT
9269                                    ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
9270                                    ;MULD IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
9271                                    ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
9272                                    ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNDNT
9273                                    ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
9274                                    ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNDNT WILL
9275                                    ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
9276                                    ;IF A TRAP OCCURS (IT SHOULD NOT) THEN OVUNDNT WILL READ THE FEC.
9277                                    ;SHOULD THE FEC MATCH THE ANTICIPATED FEC OVUNDNT WILL
9278                                    ;STORE ALL DATA AND TRANSFER CONTROL TO THE ERROR CALL AT ERR1. IF THE
```

```
                                ;FEC IS NOT THE SAME AS THE ANTICIPATED FEC OVUNDNT WILL REPORT
                                ;THE ERROR AND RETURN TO CONT. NOTE THAT OVUNDNT USES THE FLAG
                                ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
                                ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).

046344  012601                  OVUNDNT:    MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
046346  012700  000200                      MOV     #200,R0         ;SET FD MODE.
046352  170100                              LDFPS   R0

046354  010100                              MOV     R1,R0           ;LOAD AC0, OPERAND.
046356  172410                              LDD     (R0),AC0

046360  010102                              MOV     R1,R2           ;SAVE THE DATA PATTERNS IN CASE OF
046362  010237  001240                      MOV     R2,@#$TMP3      ;ERROR.
046366  062702  000010                      ADD     #10,R2
046372  010237  001242                      MOV     R2,@#$TMP4
046376  062702  000010                      ADD     #10,R2
046402  010237  001244                      MOV     R2,@#$TMP5
046406  016137  000042  001252              MOV     42(R1),@#$TMP10
046414  012737  046744  001246              MOV     #OVDNTT,@#$TMP6

046422  016100  000040                      MOV     40(R1),R0       ;LOAD THE FPS.
046426  170100                              LDFPS   R0
046430  012737  046452  001236              MOV     #1$,@#$TMP2
046436  012737  046636  000244              MOV     #25$,@#FPVECT   ;SET UP THE FP TRAP VECTOR IN CASE
                                                                    ;OF ERROR.
046444  010100                              MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
046446  062700  000010                      ADD     #10,R0

046452  171010                  1$:         MULD    (R0),AC0        ;TEST INSTRUCTION.

046454  170204                  2$:         STFPS   R4              ;GET FPS.
046456  170305                              STST    R5              ;GET FEC.
046460  012700  000200                      MOV     #200,R0         ;SET FD MODE.
046464  170100                              LDFPS   R0
046466  012700  046744                      MOV     #OVDNTT,R0      ;GET THE RESULT.
046472  174010                              STD     AC0,(R0)
046474  010437  001250                      MOV     R4,@#$TMP7
046500  010537  001254                      MOV     R5,@#$TMP11

046504  012700  046744                      MOV     #OVDNTT,R0      ;CHECK THE RESULT.
046510  010102                              MOV     R1,R2
046512  062702  000020                      ADD     #20,R2
046516  012703  000004                      MOV     #4,R3
046522  022022                  3$:         CMP     (R0)+,(R2)+
046524  001015                              BNE     15$             ;BRANCH IF INCORRECT.
046526  077303                              SOB     R3,3$

046530  026104  000042                      CMP     42(R1),R4       ;WAS FPS CORRECT?
046534  001002                              BNE     10$             ;BRANCH IF FPS IS INCORRECT.

046536  000161  000056          4$:         JMP     56(R1)          ;RETURN, TEST COMPLETED.

                                ;REPORT INCORRECT FPS.
046542  005761  000046          10$:        TST     46(R1)          ;WAS THE RESULT OVER OR UNDER FLOW?
046546  001002                              BNE     12$             ;BRANCH IF UNDERFLOW.
```

```
 9335
 9336                                                        ;REPORT FPS BAD AFTER OVERFLOW.
 9337  046550  104002          11$:    ERROR   2
 9338  046552  000771                  BR      4$
 9339
 9340  046554                  12$:                        ;REPORT FPS BAD AFTER UNDERFLOW.
 9341  046554  104002          13$:    ERROR   2
 9342  046556  000767                  BR      4$
 9343
 9344                          ;RESULT INCORRECT.
 9345  046560  012700  046744  15$:    MOV     #OVDNTT,R0      ;SEE IF FAILURE IS ANTICIPATED
 9346  046564  010102                  MOV     R1,R2           ;FAILURE.
 9347  046566  062702  000030          ADD     #30,R2
 9348  046572  012703  000004          MOV     #4,R3
 9349  046576  022022          16$:    CMP     (R0)+,(R2)+
 9350  046600  001007                  BNE     17$             ;BRANCH IF NOT ANTICIPATED.
 9351  046602  077303                  SOB     R3,16$
 9352
 9353  046604  010102                  MOV     R1,R2           ;ERROR WAS ANTICIPATED SO RETURN
 9354  046606  062702  000054          ADD     #54,R2          ;TO THE ERROR REPORT IN THE CALLING
 9355  046612  010237  001236          MOV     R2,@#$TMP2      ;ROUTINE.
 9356  046616  000112                  JMP     (R2)
 9357
 9358  046620  005761  000046  17$:    TST     46(R1)          ;RESULT WAS NOT ANTICIPATED
 9359                                                          ;SO ERROR MUST BE REPORTED HERE.
 9360                                                          ;FIRST SEE IF ARGUMENTS SHOULD
 9361                                                          ;HAVE RESULTED IN OVERFLOW OR UNDER
 9362                                                          ;FLOW BY LOOKING AT THE FLAG.
 9363  046624  001002                  BNE     19$             ;BRANCH IF UNDERFLOW EXPECTED.
 9364
 9365                                                        ;REPORT RESULT INCORRECT, EXPECTING
 9366  046626  104002          18$:    ERROR   2               ;OVERFLOW.
 9367  046630  000742                  BR      4$
 9368
 9369  046632                  19$:                        ;REPORT RESULT INCORRECT, EXPECTING
 9370  046632  104002          20$:    ERROR   2               ;UNDERFLOW.
 9371  046634  000740                  BR      4$
 9372
 9373                          ;IF AN FP TRAP OCCURS COME HERE.
 9374  046636  011602          25$:    MOV     (SP),R2         ;GET ADDRESS OF TRAP.
 9375  046640  022702  046454          CMP     #2$,R2          ;WAS THE TRAP DURING THE MULF INSTRUCTION?
 9376  046644  001402                  BEQ     26$             ;BRANCH IF YES.
 9377  046646  000137  062534          JMP     @#FPSPUR        ;OTHERWISE GO REPORT A SPURIOUS
 9378                                                          ;FP TRAP.
 9379  046652  022626          26$:    CMP     (SP)+,(SP)+     ;RESET THE STACK.
 9380  046654  010237  001236          MOV     R2,@#$TMP2      ;SAVE DATA FOR ERROR REPORT.
 9381  046660  170204                  STFPS   R4              ;GET FPS.
 9382  046662  170305                  STST    R5              ;GET FEC.
 9383  046664  012700  000200          MOV     #200,R0         ;SET FD MODE.
 9384  046670  170100                  LDFPS   R0
 9385  046672  012700  046744          MOV     #OVDNTT,R0      ;GET THE RESULT.
 9386  046676  174010                  STD     AC0,(R0)
 9387  046700  010537  001254          MOV     R5,@#$TMP11
 9388  046704  020561  000044          CMP     R5,44(R1)       ;WAS THE FEC ANTICIPATED?
 9389  046710  001004                  BNE     27$             ;BRANCH IF NOT ANTICIPATED.
 9390
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```
 9391  046712  010102                        MOV     R1,R2           ;ERROR WAS ANTICIPATED SO
 9392  046714  062702  000050                ADD     #50,R2          ;RETURN TO THE ERROR REPORT OF THE
 9393                                                                ;CALLING ROUTINE.
 9394  046720  000112                        JMP     (R2)
 9395
 9396  046722  005761  000026        27$:    TST     26(R1)          ;THE ERROR WAS NOT ANTICIPATED SO
 9397                                                                ;IT MUST BE REPORTED HERE. FIRST SEE IF EXPECTED
 9398                                                                ;OVERFLOW OR UNDER FLOW.
 9399  046726  001003                        BNE     29$             ;BRANCH IF EXPECTING UNDERFLOW
 9400
 9401                                                                ;REPORT TRAPPED ON OVERFLOW WITH FIV=0
 9402  046730  104002                28$:    ERROR   2
 9403  046732  000161  000056              JMP     56(R1)
 9404
 9405  046736                        29$:
 9406  046736  104002                30$:    ERROR   2               ;REPORT TRAPPED ON UNDER FLOW WITH FIU=0
 9407  046740  000161  000056              JMP     56(R1)
 9408
 9409  046744  000000  000000  000000  OVDNTT: .WORD   0,0,0,0
 9410  046752  000000
 9411
 9412  046754                        JJJDONE:
 9413  046754  104413                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 9414                                                                ;SEE IF THE USER HAS EXPRESSED
 9415                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
 9416                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 9417                                                                ;THE USER TYPED CONTROL G?).
 9418
 9419
 9420
 9421
 9422                                ;;**************************************************************************
 9423                                ;*TEST 52       UNDER\OVER FLOW, USING MULF WITH TRAPS ENABLED, TEST
 9424                                ;*
 9425                                ;*THIS IS A TEST OF THE UNDERFLOW AND OVERFLOW
 9426                                ;*CONDITIONS THAT CAN OCCUR USING THE MULF INSTRUCTION.
 9427                                ;*A SUBROUTINE IS CALLED TO SET UP THE OPERANDS,
 9428                                ;* EXECUTE THE MULF INSTRUCTION AND CHECK
 9429                                ;*THE RESULTS. HERE THE PARTICULAR INTERRUPT,
 9430                                ;*EITHER OVERFLOW OR UNDERFLOW, IS ENABLED SO A TRAP SHOULD
 9431                                ;*OCCUR.
 9432                                ;*
 9433                                ;;**************************************************************************
 9434  046756  000004                TST52:  SCOPE
 9435
 9436                                ;UNDERFLOW, EXPONENT OF RESULT = -129
 9437  046760                        KKK1:
 9438  046760  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 9439  046762  004737  047204                JSR     PC,@#OVUNFT
 9440  046766  020123  045676        1$:     .WORD   20123,45676     ;AC
 9441  046772  020200  000000        2$:     .WORD   20200,0         ;FSRC
 9442  046776  000123  045676        3$:     .WORD   123,45676       ;RES
 9443  047002  177777  177777        4$:     .WORD   -1,-1           ;ERROR RES.
 9444  047006  002000                5$:     2000                    ;FPS BEFORE EXECUTION.
 9445  047010  102004                        102004                  ;FPS AFTER EXECUTION.
 9446  047012  000012                6$:     12                      ;FEC
```

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 9447  047014  177777                        -1                      ;FLAG
 9448  047016  104002                7$:     ERROR   2               ;ST 331 (BUT FIU) NO TRAP.
 9449  047020  000401                        BR      8$
 9450  047022  104002                        ERROR   2
 9451  047024                        8$:
 9452
 9453                                ;UNDERFLOW, EXPONENT OF THE RESULT = -193
 9454  047024                        KKK3:
 9455  047024  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 9456  047026  004737  047204                JSR     PC,@#OVUNFT
 9457  047032  010127  127272        1$:     .WORD   10127,127272    ;AC
 9458  047036  010200  000000        2$:     .WORD   10200,0         ;FSRC
 9459  047042  060127  127272        3$:     .WORD   60127,127272    ;RES
 9460  047046  177777  177777        4$:     .WORD   -1,-1           ;ERROR RES.
 9461  047052  007017                5$:     7017                    ;FPS BEFORE EXECUTION.
 9462  047054  107000                        107000                  ;FPS AFTER EXECUTION.
 9463  047056  000012                6$:     12                      ;FEC
 9464  047060  177777                        -1
 9465  047062  104002                7$:     ERROR   2               ;ST 331 (BUT FIU) NO TRAP.
 9466  047064  000401                        BR      8$
 9467  047066  104002                        ERROR   2
 9468  047070                        8$:
 9469
 9470                                ;OVERFLOW, EXPONENT OF THE RESULT = 128
 9471  047070                        KKK4:
 9472  047070  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 9473  047072  004737  047204                JSR     PC,@#OVUNFT
 9474  047076  060252  125252        1$:     .WORD   60252,125252    ;AC
 9475  047102  060000  000000        2$:     .WORD   60000,0         ;FSRC
 9476  047106  000052  125252        3$:     .WORD   000052,125252   ;RES
 9477  047112  177777  177777        4$:     .WORD   -1,-1           ;ERROR RES.
 9478  047116  001000                5$:     1000                    ;FPS BEFORE EXECUTION.
 9479  047120  101006                        101006                  ;FPS AFTER EXECUTION.
 9480  047122  000010                6$:     10                      ;FEC
 9481  047124  000000                        0                       ;FLAG
 9482  047126  104002                7$:     ERROR   2               ;ST 333 (BUT FIV) NO TRAP
 9483  047130  000401                        BR      8$
 9484  047132  104002                        ERROR   2
 9485  047134                        8$:
 9486
 9487                                ;OVERFLOW, EXPONENT OF RESULT = 130
 9488  047134                        KKK5:
 9489  047134  104414                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 9490  047136  004737  047204                JSR     PC,@#OVUNFT
 9491  047142  060345  067654        1$:     .WORD   60345,67654     ;AC
 9492  047146  060200  000000        2$:     .WORD   60200,0         ;FSRC
 9493  047152  000345  067654        3$:     .WORD   345,67654       ;RES
 9494  047156  177777  177777        4$:     .WORD   -1,-1           ;ERROR RES.
 9495  047162  007015                5$:     7015                    ;FPS BEFORE EXECUTION.
 9496  047164  107002                        107002                  ;FPS AFTER EXECUTION.
 9497  047166  000010                6$:     10                      ;FEC
 9498  047170  000000                        0                       ;FLAG
 9499  047172  104002                7$:     ERROR   2               ;ST 133 (BUT FIV) NO TRAP
 9500  047174  000401                        BR      8$
 9501  047176  104002                        ERROR   2
 9502  047200  000167  000412        8$:     JMP     KKKDONE
```

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                                ;THIS SUBROUTINE, OVUNFT, IS USED TO SET UP THE OPERANDS, EXECUTE
                                ;THE MULF INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
                                ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
                                ;TO IT IS MADE THUS:
                                ;
                                ;               ACARG:  .WORD   X,X             ;AC OPERAND
                                ;               FSRCARG:.WORD   X,X             ;FSRC OPERAND
                                ;               RES:    .WORD   X,X             ;EXPECTED RESULT
                                ;               ERRES:  .WORD   X,X             ;ERROR RESULT
                                ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
                                ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
                                ;               FEC:    .WORD   X               ;EXPECTED FEC
                                ;               FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
                                ;               ERR1:   ERROR   X               ;TRAP ERROR.
                                ;               BR      CONT
                                ;               ERR2:   ERROR   X               ;DATA, RESULT ERROR
                                ;               CONT:                           ;RETURN ADDRESS
                                ;
                                ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
                                ;THE MULF INSTRUCTION IS EXECUTED. IF THE TRAP OCCURS THEN THE
                                ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
                                ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNFT RETURNS CONTROL
                                ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNFT
                                ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. THE FEC IS TREATED
                                ;IN THE SAME WAY. IF THE RESULT OF THE
                                ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
                                ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
                                ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNFT
                                ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
                                ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNFT WILL
                                ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
                                ;IF NO TRAP OCCURS CONTROL IS PASSED TO ERR1.
                                ;NOTE THAT OVUNFNT USES THE FLAG
                                ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
                                ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).

047204  012601                  OVUNFT: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
047206  012700  000200                  MOV     #200,R0         ;SET FD MODE.
047212  170100                          LDFPS   R0

047214  010100                          MOV     R1,R0           ;LOAD AC0, OPERAND.
047216  172410                          LDD     (R0),AC0

047220  010102                          MOV     R1,R2           ;SAVE THE DATA PATTERNS IN CASE OF
047222  010237  001240                  MOV     R2,@#$TMP3      ;ERROR.
047226  062702  000004                  ADD     #4,R2
047232  010237  001242                  MOV     R2,@#$TMP4
047236  062702  000004                  ADD     #4,R2
047242  010237  001244                  MOV     R2,@#$TMP5
047246  016137  000022  001252          MOV     22(R1),@#$TMP10
047254  012737  047606  001246          MOV     #OVFTT,@#$TMP6

047262  016100  000020                  MOV     20(R1),R0       ;LOAD THE FPS.
047266  170100                          LDFPS   R0
047270  012737  047312  001236          MOV     #1$,@#$TMP2
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 9559  047276  012737  047322  000244          MOV     #50$,@#FPVECT   ;SET UP THE FP TRAP VECTOR IN CASE
 9560                                                                  ;OF ERROR.
 9561  047304  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
 9562  047306  062700  000004                  ADD     #4,R0
 9563
 9564  047312  171010                  1$:     MULF    (R0),AC0        ;TEST INSTRUCTION. SHOULD CAUSE TRAP.
 9565  047314  170000                  2$:     CFCC
 9566
 9567  047316  000137  047546                  JMP     @#25$           ;FAILURE, NO TRAP.
 9568
 9569  047322  011602                  50$:    MOV     (SP),R2         ;TRAP TO HERE AND SEE IF THE PC OF THE
 9570  047324  020227  047314                  CMP     R2,#2$          ;TRAP WAS THAT OF THE MULF INSTRUCTION.
 9571  047330  001402                          BEQ     51$             ;BRANCH IF YES.
 9572  047332  000137  062534                  JMP     @#FPSPUR        ;OTHERWISE REPORT SPURIOUS FP ERROR.
 9573
 9574  047336  022626                  51$:    CMP     (SP)+,(SP)+     ;RESET THE STACK
 9575  047340  170204                          STFPS   R4              ;GET FPS.
 9576  047342  170305                          STST    R5              ;GET FEC.
 9577  047344  012700  000200                  MOV     #200,R0         ;SET FD MODE.
 9578  047350  170100                          LDFPS   R0
 9579  047352  012700  047606                  MOV     #OVFTT,R0       ;GET THE RESULT.
 9580  047356  174010                          STD     AC0,(R0)
 9581  047360  010437  001250                  MOV     R4,@#$TMP7
 9582  047364  010537  001254                  MOV     R5,@#$TMP11
 9583
 9584  047370  012700  047606                  MOV     #OVFTT,R0       ;CHECK THE RESULT.
 9585  047374  010102                          MOV     R1,R2
 9586  047376  062702  000010                  ADD     #10,R2
 9587  047402  012703  000002                  MOV     #2,R3
 9588  047406  022022                  3$:     CMP     (R0)+,(R2)+
 9589  047410  001027                          BNE     15$             ;BRANCH IF INCORRECT.
 9590  047412  077303                          SOB     R3,3$
 9591
 9592  047414  026104  000022                  CMP     22(R1),R4       ;WAS FPS CORRECT?
 9593  047420  001014                          BNE     10$             ;BRANCH IF FPS IS INCORRECT.
 9594
 9595  047422  026105  000024                  CMP     24(R1),R5       ;IS FEC CORRECT?
 9596  047426  001002                          BNE     5$              ;IF INCORRECT BRANCH.
 9597  047430  000161  000036          4$:     JMP     36(R1)          ;RETURN, TEST COMPLETED.
 9598
 9599                                  ;REPORT INCORRECT FEC.
 9600  047434  005761  000026          5$:     TST     26(R1)          ;WAS THE RESULT OVERFLOW OR UNDERFLOW?
 9601  047440  001002                          BNE     7$              ;BRANCH IF UNDERFLOW.
 9602
 9603                                                                  ;REPORT BAD FEC ON EXPECTED OVERFLOW.
 9604  047442  104002                  6$:     ERROR   2
 9605  047444  000771                          BR      4$
 9606
 9607  047446                          7$:                             ;REPORT BAD FEC ON EXPECTED UNDERFLOW.
 9608  047446  104002                  8$:     ERROR   2
 9609  047450  000767                          BR      4$
 9610
 9611                                  ;REPORT INCORRECT FPS.
 9612  047452  005761  000026          10$:    TST     26(R1)          ;WAS THE RESULT OVER OR UNDER FLOW?
 9613  047456  001002                          BNE     12$             ;BRANCH IF UNDERFLOW.
 9614
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 9615
 9616  047460  104002                  11$:    ERROR   2                ;REPORT FPS BAD AFTER OVERFLOW.
 9617  047462  000762                          BR      4$
 9618
 9619  047464                          12$:                             ;REPORT FPS BAD AFTER UNDERFLOW.
 9620  047464  104002                  13$:    ERROR   2
 9621  047466  000760                          BR      4$
 9622
 9623                                  ;RESULT INCORRECT.
 9624  047470  012700  047606          15$:    MOV     #OVFTT,R0        ;SEE IF FAILURE IS ANTICIPATED
 9625  047474  010102                          MOV     R1,R2            ;FAILURE.
 9626  047476  062702  000014                  ADD     #14,R2
 9627  047502  012703  000002                  MOV     #2,R3
 9628  047506  022022                  16$:    CMP     (R0)+,(R2)+
 9629  047510  001007                          BNE     17$              ;BRANCH IF NOT ANTICIPATED.
 9630  047512  077303                          SOB     R3,16$
 9631
 9632  047514  010102                          MOV     R1,R2            ;ERROR WAS ANTICIPATED SO RETURN
 9633  047516  062702  000034                  ADD     #34,R2           ;TO THE ERROR REPORT IN THE CALLING
 9634  047522  010237  001236                  MOV     R2,@#$TMP2       ;ROUTINE.
 9635  047526  000112                          JMP     (R2)
 9636
 9637  047530  005761  000026          17$:    TST     26(R1)           ;RESULT WAS NOT ANTICIPATED
 9638                                                                   ;SO ERROR MUST BE REPORTED HERE.
 9639                                                                   ;FIRST SEE IF ARGUMENTS SHOULD
 9640                                                                   ;HAVE RESULTED IN OVERFLOW OR UNDER
 9641                                                                   ;FLOW BY LOOKING AT THE FLAG.
 9642  047534  001002                          BNE     19$              ;BRANCH IF UNDERFLOW EXPECTED.
 9643
 9644                                                                   ;REPORT RESULT INCORRECT, EXPECTING
 9645  047536  104002                  18$:    ERROR   2                ;OVERFLOW.
 9646  047540  000733                          BR      4$
 9647
 9648  047542                          19$:                             ;REPORT RESULT INCORRECT, EXPECTING
 9649  047542  104002                  20$:    ERROR   2                ;UNDERFLOW.
 9650  047544  000731                          BR      4$
 9651
 9652                                  ;IF NO FP TRAP OCCURS COME HERE.
 9653  047546  170204                  25$:    STFPS   R4               ;GET FPS.
 9654  047550  170305                          STST    R5               ;GET FEC.
 9655  047552  012700  000200                  MOV     #200,R0          ;SET FD MODE.
 9656  047556  170100                          LDFPS   R0
 9657  047560  012700  047606                  MOV     #OVFTT,R0        ;GET THE RESULT.
 9658  047564  174010                          STD     AC0,(R0)
 9659  047566  010437  001250                  MOV     R4,@#$TMP7
 9660  047572  010537  001254                  MOV     R5,@#$TMP11
 9661  047576  010102                          MOV     R1,R2            ;ERROR WAS ANTICIPATED SO
 9662  047600  062702  000030                  ADD     #30,R2           ;RETURN TO THE ERROR REPORT OF THE
 9663                                                                   ;CALLING ROUTINE.
 9664  047604  000112                          JMP     (R2)
 9665
 9666  047606  000000  000000  000000  OVFTT:  .WORD   0,0,0,0
 9667  047614  000000
 9668
 9669  047616                          KKKDONE:
 9670  047616  104413                          RSETUP                   ;GO INITIALIZE THE FPS AND STACK; AND
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                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                ;THE USER TYPED CONTROL G?).



                                        ;;**********************************************************************
                                        ;*TEST 53       UNDER\OVER FLOW, USING MULD WITH TRAPS ENABLED, TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE OVER FLOW AND UNDER FLOW CONDITIONS USING THE
                                        ;*MULD INSTRUCTION WITH TRAPS ENABLED. A SUBROUTINE IS USED TO SET UP
                                        ;*THE OPERANDS, EXECUTE THE MULD INSTRUCTION AND CHECK THE RESULTS.
                                        ;*
                                        ;;**********************************************************************
047620  000004                          TST53:  SCOPE

                                        ;UNDERFLOW, EXPONENT OF RESULT = -'29
047622                                  LLL1:
047622  104414                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
047624  004737  050146                          JSR     PC,@#OVUNDT
047630  020052  125252                  1$:     .WORD   20052,125252    ;AC
047634  125252  125252                          .WORD   125252,125252
047640  020300  000000  000000          2$:     .WORD   20300,0,0,0     ;FSRC
047646  000000
047650  000177  177777  177777          3$:     .WORD   177,-1,-1,-1    ;RES
047656  177777
047660  000177  177777                  4$:     .WORD   177,-1          ;ERROR RES.
047664  125252  125252                          .WORD   125252,125252
047670  002200                          5$:     2200                    ;FPS BEFORE EXECUTION.
047672  102204                                  102204                  ;FPS AFTER EXECUTION.
047674  000012                          6$:     12                      ;FEC
047676  177777                                  -1                      ;FLAG
047700  104002                          7$:     ERROR   2               ;ST 331 (BUT FIU) NO TRAP.
047702  000401                                  BR      8$
047704  104002                                  ERROR   2               ;ST 155 (BUT FD)
047706                                  8$:

                                        ;UNDERFLOW, EXPONENT OF THE RESULT = -193
047706                                  LLL2:
047706  104414                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
047710  004737  050146                          JSR     PC,@#OVUNDT
047714  010327  127272                  1$:     .WORD   10327,127272    ;AC
047720  036363  045454                          .WORD   36363,45454
047724  010000  000000  000000          2$:     .WORD   10000,0,0,0     ;FSRC
047732  000000
047734  060127  127272                  3$:     .WORD   60127,127272    ;RES
047740  036363  045454                          .WORD   36363,45454
047744  177777  177777  177777          4$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
047752  177777
047754  007217                          5$:     7217                    ;FPS BEFORE EXECUTION.
047756  107200                                  107200                  ;FPS AFTER EXECUTION.
047760  000012                          6$:     12                      ;FEC
047762  177777                                  -1                      ;FLAG
047764  104002                          7$:     ERROR   2               ;ST 137 (BUT FIU) NO TRAP.
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 9727  047766  000401                          BR      8$
 9728  047770  104002                          ERROR   2
 9729  047772                          8$:
 9730
 9731                                  ;OVERFLOW, EXPONENT OF THE RESULT = 128
 9732  047772                          LLL3:
 9733  047772  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 9734  047774  004737  050146                  JSR     PC,@#OVUNDT
 9735  050000  060252  125252          1$:     .WORD   60252,125252            ;AC
 9736  050004  125252  125252                  .WORD   125252,125252           ;FSRC
 9737  050010  160100  000000  000000  2$:     .WORD   160100,0,0,0            ;FSRC
 9738  050016  000000
 9739  050020  100177  177777  177777  3$:     .WORD   100177,-1,-1,-1         ;RES
 9740  050026  177777
 9741  050030  100177  177777          4$:     .WORD   100177,-1               ;ERROR RES.
 9742  050034  125252  125252                  .WORD   125252,125252
 9743  050040  001200                  5$:     1200                            ;FPS BEFORE EXECUTION.
 9744  050042  101216                          101216                          ;FPS AFTER EXECUTION.
 9745  050044  000010                  6$:     10                              ;FEC
 9746  050046  000000                          0                               ;FLAG
 9747  050050  104002                  7$:     ERROR   2                       ;ST 333 (BUT FIV) NO TRAP.
 9748  050052  000401                          BR      8$
 9749  050054  104002                          ERROR   2                       ;ST 700 (BUT FD).
 9750  050056                          8$:
 9751
 9752                                  ;OVERFLOW, EXPONENT OF THE RESULT = 130
 9753  050056                          LLL4:
 9754  050056  104414                          LPERR                           ;SET UP THE LOOP ON ERROR ADDRESS.
 9755  050060  004737  050146                  JSR     PC,@#OVUNDT
 9756  050064  060345  067654          1$:     .WORD   60345,67654             ;AC
 9757  050070  056765  045676                  .WORD   56765,45676
 9758  050074  060200  000000  000000  2$:     .WORD   60200,0,0,0             ;FSRC
 9759  050102  000000
 9760  050104  000345  067654          3$:     .WORD   345,67654               ;RES
 9761  050110  056765  045676                  .WORD   56765,45676
 9762  050114  177777  177777  177777  4$:     .WORD   -1,-1,-1,-1             ;ERROR RES.
 9763  050122  177777
 9764  050124  007215                  5$:     7215                            ;FPS BEFORE EXECUTION.
 9765  050126  107202                          107202                          ;FPS AFTER EXECUTION.
 9766  050130  000010                  6$:     10                              ;FEC
 9767  050132  000000                          0                               ;FLAG
 9768  050134  104002                  7$:     ERROR   2                       ;ST 133 (BUT FIV) NO TRAP
 9769  050136  000401                          BR      8$
 9770  050140  104002                          ERROR   2
 9771  050142  000137  050560          8$:     JMP     @#LLLDONE
 9772
 9773                                  ;THIS SUBROUTINE, OVUNDT, IS USED TO SET UP THE OPERANDS, EXECUTE
 9774                                  ;THE MULD INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
 9775                                  ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
 9776                                  ;TO IT IS MADE THUS:
 9777                                  ;
 9778                                  ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
 9779                                  ;               FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
 9780                                  ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
 9781                                  ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
 9782                                  ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
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                                ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
                                ;               FEC:    .WORD   X               ;EXPECTED FEC
                                ;               FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
                                ;               ERR1:   ERROR   X               ;TRAP ERROR.
                                ;               BR      CONT
                                ;               ERR2:   ERROR   X               ;DATA, RESULT ERROR
                                ;               CONT:                           ;RETURN ADDRESS
                                ;
                                ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
                                ;THE MULD INSTRUCTION IS EXECUTED. IF THE TRAP OCCURS THEN THE
                                ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
                                ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNDT RETURNS CONTROL
                                ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNDT
                                ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. THE FEC IS TREATED
                                ;IN THE SAME WAY. IF THE RESULT OF THE
                                ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
                                ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
                                ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNDT
                                ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
                                ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNDT WILL
                                ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
                                ;IF NO TRAP OCCURS CONTROL IS PASSED TO ERR1.
                                ;NOTE THAT OVUNDNT USES THE FLAG
                                ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
                                ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).

050146  012601                  OVUNDT: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
050150  012700  000200                  MOV     #200,R0         ;SET FD MODE.
050154  170100                          LDFPS   R0

050156  010100                          MOV     R1,R0           ;LOAD AC0, OPERAND.
050160  172410                          LDD     (R0),AC0

050162  010102                          MOV     R1,R2           ;SAVE THE DATA PATTERNS IN CASE OF
050164  010237  001240                  MOV     R2,@#$TMP3      ;ERROR.
050170  062702  000010                  ADD     #10,R2
050174  010237  001242                  MOV     R2,@#$TMP4
050200  062702  000010                  ADD     #10,R2
050204  010237  001244                  MOV     R2,@#$TMP5
050210  016137  000042  001252          MOV     42(R1),@#$TMP10
050216  012737  050550  001246          MOV     #OVDTT,@#$TMP6

050224  016100  000040                  MOV     40(R1),R0       ;LOAD THE FPS.
050230  170100                          LDFPS   R0
050232  012737  050254  001236          MOV     #1$,@#$TMP2
050240  012737  050264  000244          MOV     #50$,@#FPVECT   ;SET UP THE FP TRAP VECTOR IN CASE
                                                                ;OF ERROR.
050246  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
050250  062700  000010                  ADD     #10,R0

050254  171010                  1$:     MULD    (R0),AC0        ;TEST INSTRUCTION. SHOULD CAUSE TRAP.
050256  170000                  2$:     CFCC

050260  000137  050510                  JMP     @#25$           ;FAILURE, NO TRAP.

050264  011602                  50$:    MOV     (SP),R2         ;TRAP TO HERE AND SEE IF THE PC OF THE
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 9839  050266  020227  050256                 CMP     R2,#2$          ;TRAP WAS THAT OF THE MULF INSTRUCTION.
 9840  050272  001402                         BEQ     51$             ;BRANCH IF YES.
 9841  050274  000137  062534                 JMP     @#FPSPUR        ;OTHERWISE REPORT SPURIOUS FP ERROR.
 9842
 9843  050300  022626              51$:       CMP     (SP)+,(SP)+     ;RESET THE STACK
 9844  050302  170204                         STFPS   R4              ;GET FPS.
 9845  050304  170305                         STST    R5              ;GET FEC.
 9846  050306  012700  000200                 MOV     #200,R0         ;SET FD MODE.
 9847  050312  170100                         LDFPS   R0
 9848  050314  012700  050550                 MOV     #OVDTT,R0       ;GET THE RESULT.
 9849  050320  174010                         STD     AC0,(R0)
 9850  050322  010437  001250                 MOV     R4,@#$TMP7
 9851  050326  010537  001254                 MOV     R5,@#$TMP11
 9852
 9853  050332  012700  050550                 MOV     #OVDTT,R0       ;CHECK THE RESULT.
 9854  050336  010102                         MOV     R1,R2
 9855  050340  062702  000020                 ADD     #20,R2
 9856  050344  012703  000004                 MOV     #4,R3
 9857  050350  022022              3$:        CMP     (R0)+,(R2)+
 9858  050352  001027                         BNE     15$             ;BRANCH IF INCORRECT.
 9859  050354  077303                         SOB     R3,3$
 9860
 9861  050356  026104  000042                 CMP     42(R1),R4       ;WAS FPS CORRECT?
 9862  050362  001014                         BNE     10$             ;BRANCH IF FPS IS INCORRECT.
 9863
 9864  050364  026105  000044                 CMP     44(R1),R5       ;IS FEC CORRECT?
 9865  050370  001002                         BNE     5$              ;IF INCORRECT BRANCH.
 9866  050372  000161  000056      4$:        JMP     56(R1)          ;RETURN, TEST COMPLETED.
 9867
 9868                              ;REPORT INCORRECT FEC.
 9869  050376  005761  000046      5$:        TST     46(R1)          ;WAS THE RESULT OVERFLOW OR UNDERFLOW?
 9870  050402  001002                         BNE     7$              ;BRANCH IF UNDERFLOW.
 9871
 9872                                                                 ;REPORT BAD FEC ON EXPECTED OVERFLOW.
 9873  050404  104002              6$:        ERROR   2
 9874  050406  000771                         BR      4$
 9875
 9876  050410                      7$:                                ;REPORT BAD FEC ON EXPECTED UNDERFLOW.
 9877  050410  104002              8$:        ERROR   2
 9878  050412  000767                         BR      4$
 9879
 9880                              ;REPORT INCORRECT FPS.
 9881  050414  005761  000046      10$:       TST     46(R1)          ;WAS THE RESULT OVER OR UNDER FLOW?
 9882  050420  001002                         BNE     12$             ;BRANCH IF UNDERFLOW.
 9883
 9884                                                                 ;REPORT FPS BAD AFTER OVERFLOW.
 9885  050422  104002              11$:       ERROR   2
 9886  050424  000762                         BR      4$
 9887
 9888  050426                      12$:                               ;REPORT FPS BAD AFTER UNDERFLOW.
 9889  050426  104002              13$:       ERROR   2
 9890  050430  000760                         BR      4$
 9891
 9892                              ;RESULT INCORRECT.
 9893  050432  012700  050550      15$:       MOV     #OVDTT,R0       ;SEE IF FAILURE IS ANTICIPATED
 9894  050436  010102                         MOV     R1,R2           ;FAILURE.
```

```
 9895  050440  062702  000030              ADD     #30,R2
 9896  050444  012703  000004              MOV     #4,R3
 9897  050450  022022              16$:    CMP     (R0)+,(R2)+
 9898  050452  001007                      BNE     17$             ;BRANCH IF NOT ANTICIPATED.
 9899  050454  077303                      SOB     R3,16$
 9900
 9901  050456  010102                      MOV     R1,R2           ;ERROR WAS ANTICIPATED SO RETURN
 9902  050460  062702  000054              ADD     #54,R2          ;TO THE ERROR REPORT IN THE CALLING
 9903  050464  010237  001236              MOV     R2,@#$TMP2      ;ROUTINE.
 9904  050470  000112                      JMP     (R2)
 9905
 9906  050472  005761  000046    17$:      TST     46(R1)          ;RESULT WAS NOT ANTICIPATED
 9907                                                              ;SO ERROR MUST BE REPORTED HERE.
 9908                                                              ;FIRST SEE IF ARGUMENTS SHOULD
 9909                                                              ;HAVE RESULTED IN OVERFLOW OR UNDER
 9910                                                              ;FLOW BY LOOKING AT THE FLAG.
 9911  050476  001002                      BNE     19$             ;BRANCH IF UNDERFLOW EXPECTED.
 9912
 9913                                                              ;REPORT RESULT INCORRECT, EXPECTING
 9914  050500  104002              18$:    ERROR   2               ;OVERFLOW.
 9915  050502  000733                      BR      4$
 9916
 9917  050504                      19$:
 9918  050504  104002              20$:    ERROR   2               ;REPORT RESULT INCORRECT, EXPECTING
 9919  050506  000731                      BR      4$              ;UNDERFLOW.
 9920
 9921                              ;IF NO FP TRAP OCCURS COME HERE.
 9922  050510  170204              25$:    STFPS   R4              ;GET FPS.
 9923  050512  170305                      STST    R5              ;GET FEC.
 9924  050514  012700  000200              MOV     #200,R0         ;SET FD MODE.
 9925  050520  170100                      LDFPS   R0
 9926  050522  012700  050550              MOV     #OVDTT,R0       ;GET THE RESULT.
 9927  050526  174010                      STD     AC0,(R0)
 9928  050530  010437  001250              MOV     R4,@#$TMP7
 9929  050534  010537  001254              MOV     R5,@#$TMP11
 9930  050540  010102                      MOV     R1,R2           ;ERROR WAS ANTICIPATED SO
 9931  050542  062702  000050              ADD     #50,R2          ;RETURN TO THE ERROR REPORT OF THE
 9932                                                              ;CALLING ROUTINE.
 9933  050546  000112                      JMP     (R2)
 9934
 9935  050550  000000  000000  000000  OVDTT:  .WORD   0,0,0,0
 9936  050556  000000
 9937
 9938  050560                      LLLDONE:
 9939  050560  104413                      RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
 9940                                                              ;SEE IF THE USER HAS EXPRESSED
 9941                                                              ;THE DESIRE TO CHANGE THE SOFTWARE
 9942                                                              ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
 9943                                                              ;THE USER TYPED CONTROL G?).
 9944
 9945
 9946
 9947
 9948
 9949                              ;;*****************************************************************
 9950                              ;*TEST 54        MODF TEST
```

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 9951                                   ;*
 9952                                   ;*THIS IS A TEST OF THE MODF INSTRUCTION, WHICH MAKES USE OF
 9953                                   ;*A SUBROUTINE TO SET UP THE OPERANDS, EXECUTE THE MODF INSTRUCTION
 9954                                   ;*AND CHECK THE RESULTS.
 9955                                   ;*
 9956                                   ;;*********************************************************************
 9957  050562  000004                  TST54:  SCOPE
 9958
 9959                                   ;MODF WITH (FSRC=AC=0)
 9960  050564                           GGG1:
 9961  050564  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 9962  050566  004737  051650                  JSR     PC,@#MODFSUB
 9963  050572  000000  000000          1$:     .WORD   0,0             ;AC
 9964  050576  000000  000000          2$:     .WORD   0,0             ;FSRC
 9965  050602  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
 9966  050606  000000  000000          4$:     .WORD   0,0             ;INTEGER RES.
 9967  050612  177777  177777          5$:     .WORD   -1,-1           ;ERROR FRACTIONAL RES.
 9968  050616  177777  177777          6$:     .WORD   -1,-1           ;ERROR INGETER RES.
 9969  050622  000013                  7$:     13                      ;FPS BEFORE EXECUTION.
 9970  050624  000004                          4                       ;FPS AFTER EXECUTION.
 9971  050626  104002                  8$:     ERROR   2               ;STORE SINGLE ZERO BAD.
 9972  050630  000401                          BR      9$
 9973  050632  104002                          ERROR   2               ;AC V 1 <= ZERO FAILED.
 9974  050634                           9$:
 9975
 9976                                   ;MODF TEST, WITH (FSRC=0)
 9977  050634                           GGG2:
 9978  050634  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 9979  050636  004737  051650                  JSR     PC,@#MODFSUB
 9980  050642  123456  076543          1$:     .WORD   123456,76543    ;AC
 9981  050646  000000  000000          2$:     .WORD   0,0             ;FSRC
 9982  050652  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
 9983  050656  000000  000000          4$:     .WORD   0,0             ;INTEGER RESULT.
 9984  050662  123456  076543          5$:     .WORD   123456,76543    ;ERROR FRACTIONAL RES.
 9985  050666  177777  177777          6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
 9986  050672  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
 9987  050674  000004                          4                       ;FPS AFTER EXECUTION.
 9988  050676  104002                  8$:     ERROR   2               ;STORE ZERO FAILURE.
 9989  050700  000401                          BR      9$
 9990  050702  104002                          ERROR   2
 9991  050704                           9$:
 9992
 9993                                   ;MODF TEST WITH (AC=0)
 9994  050704                           GGG3:
 9995  050704  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 9996  050706  004737  051650                  JSR     PC,@#MODFSUB
 9997  050712  000000  000000          1$:     .WORD   0,0             ;AC
 9998  050716  076543  021234          2$:     .WORD   76543,21234     ;FSRC
 9999  050722  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
10000  050726  000000  000000          4$:     .WORD   0,0             ;INTEGER RES.
10001  050732  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
10002  050736  177777  177777          6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
10003  050742  000003                  7$:     3                       ;FPS BEFORE EXECUTION.
10004  050744  000004                          4                       ;FPS AFTER EXECUTION.
10005  050746  104002                  8$:     ERROR   2               ;RES.BAD
10006  050750  000401                          BR      9$
```

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10007  050752  104002                          ERROR   2
10008  050754                          9$:
10009
10010                                  ;MODF TEST WITH EXPONENT OF THE RESULT = 25
10011  050754                          GGG4:
10012  050754  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10013  050756  004737  051650                  JSR     PC,@#MODFSUB
10014  050762  046252  125252          1$:     .WORD   46252,125252    ;AC
10015  050766  040300  000000          2$:     .WORD   40300,0         ;FSRC
10016  050772  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
10017  050776  046377  177777          4$:     .WORD   46377,-1        ;INTEGER RES.
10018  051002  046252  125252          5$:     .WORD   46252,125252    ;ERROR FRACTIONAL RES.
10019  051006  040300  000000          6$:     .WORD   40300,0         ;ERROR INTEGER RES.
10020  051012  000013                  7$:     13                      ;FPS BEFORE EXECUTION.
10021  051014  000004                          4                       ;FPS AFTER EXECUTION.
10022  051016  104002                  8$:     ERROR   2               ;ST 134
10023  051020  000401                          BR      9$
10024  051022  104002                          ERROR   2
10025  051024                          9$:
10026
10027                                  ;MODF TEST WITH EXPONENT OF THE RESULT = 127
10028  051024                          GGG5:
10029  051024  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10030  051026  004737  051650                  JSR     PC,@#MODFSUB
10031  051032  077652  125252          1$:     .WORD   77652,125252    ;AC
10032  051036  040300  000000          2$:     .WORD   40300,0         ;FSRC
10033  051042  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
10034  051046  077777  177777          4$:     .WORD   77777,-1        ;INTEGER RES.
10035  051052  077652  125252          5$:     .WORD   77652,125252    ;ERROR FRACTIONAL RES.
10036  051056  040300  000000          6$:     .WORD   40300,0         ;ERROR INTEGER RES.
10037  051062  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
10038  051064  000004                          4                       ;FPS AFTER EXECUTION.
10039  051066  104002                  8$:     ERROR   2
10040  051070  000401                          BR      9$
10041  051072  104002                          ERROR   2
10042  051074                          9$:
10043
10044                                  ;MODF TEST WITH EXPONENT OF RESULT = 25
10045  051074                          GGG6:
10046  051074  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10047  051076  004737  051650                  JSR     PC,@#MODFSUB
10048  051102  046200  000001          1$:     .WORD   46200,1         ;AC
10049  051106  040340  000000          2$:     .WORD   40340,0         ;FSRC
10050  051112  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
10051  051116  046340  000001          4$:     .WORD   46340,1         ;INTEGER RES.
10052  051122  040000  000000          5$:     .WORD   40000,0         ;ERROR FRACTIONAL RES.
10053  051126  177777  177777          6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
10054  051132  000013                  7$:     13                      ;FPS BEFORE EXECUTION.
10055  051134  000004                          4                       ;FPS AFTER EXECUTION.
10056  051136  104C02                  8$:     ERROR   2               ;BAD CONSTANT (NOT 24),
10057                                                                  ;OR ST 525 TO 050 INTO 150.
10058  051140  000401                          BR      9$
10059  051142  104002                          ERROR   2
10060  051144                          9$:
10061
10062                                  ;MODF   TEST WITH EXPONENT OF THE RESULT = 24
```

```
10063  051144
10064  051144  104414
10065  051146  004737  051650          GGG7:
                                               LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
                                               JSR     PC,@#MODFSUB
10066  051152  046000  000001          1$:     .WORD   46000,1         ;AC
10067  051156  040340  000000          2$:     .WORD   40340,0         ;FSRC
10068  051162  040100  000000          3$:     .WORD   40100,0         ;FRACTIONAL RES.
10069  051166  046140  000001          4$:     .WORD   46140,1         ;INTEGER RESULT.
10070  051172  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
10071  051176  177777  177777          6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
10072  051202  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
10073  051204  000000                          0                       ;FPS AFTER EXECUTION.
10074  051206  104002                  8$:     ERROR   2               ;BAD CONSTANT USED (NOT 24)
10075                                                                  ;OR ST 525 TO 150 INTO 050
10076  051210  000401                          BR      9$
10077  051212  104002                          ERROR   2
10078  051214                          9$:
10079
10080                                  ;MODF TEST WITH EXPONENT OF THE RESULT = 10
10081  051214                          GGG8:
10082  051214  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10083  051216  004737  051650                  JSR     PC,@#MODFSUB
10084  051222  042577  177777          1$:     .WORD   42577,-1        ;AC
10085  051226  040200  000000          2$:     .WORD   40200,0         ;FSRC
10086  051232  040177  176000          3$:     .WORD   40177,176000    ;FRACTIONAL RES.
10087  051236  042577  140000          4$:     .WORD   42577,140000    ;INTEGER RES.
10088  051242  177777  177777          5$:     .WORD   -1,-1           ;ERROR FRACTIONAL RES.
10089  051246  177777  177777          6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
10090  051252  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
10091  051254  000000                          0                       ;FPS AFTER EXECUTION.
10092  051256  104002                  8$:     ERROR   2
10093  051260  000401                          BR      9$
10094  051262  104002                          ERROR   2
10095  051264                          9$:
10096
10097                                  ;MODF TEST WITH THE EXPONENT OF THE RESULT = 10
10098  051264                          GGG9:
10099  051264  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10100  051266  004737  051650                  JSR     PC,@#MODFSUB
10101  051272  042577  140001          1$:     .WORD   42577,140001    ;AC
10102  051276  040200  000000          2$:     .WORD   40200,0         ;FSRC
10103  051302  034600  000000          3$:     .WORD   34600,0         ;FRACTIONAL RES.
10104  051306  042577  140000          4$:     .WORD   42577,140000    ;INTEGER RES.
10105  051312  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
10106  051316  177777  177777          6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
10107  051322  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
10108  051324  000000                          0                       ;FPS AFTER EXECUTION.
10109  051326  104002                  8$:     ERROR   2               ;ST 532 TO 122 INTO NORMALIZE.
10110  051330  000401                          BR      9$
10111  051332  104002                          ERROR   2
10112  051334                          9$:
10113
10114                                  ;MODF TEST WITH EXPONENT OF THE RESULT = 9
10115  051334                          GGG10:
10116  051334  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10117  051336  004737  051650                  JSR     PC,@#MODFSUB
10118  051342  042377  100000          1$:     .WORD   42377,100000    ;AC
```

```
10119  051346  040200  000000          2$:     .WORD   40200,0          ;FSRC
10120  051352  000000  000000          3$:     .WORD   0,0              ;FRACTIONAL RES.
10121  051356  042377  100000          4$:     .WORD   42377,100000     ;INTEGER RES.
10122  051362  177777  177777          5$:     .WORD   -1,-1            ;ERROR FRACTIONAL RES.
10123  051366  177777  177777          6$:     .WORD   -1,-1            ;ERROR INTEGER RES.
10124  051372  000013                  7$:     13                       ;FPS BEFORE EXECUTION.
10125  051374  000004                          4                        ;FPS AFTER EXECUTION.
10126  051376  104002                  8$:     ERROR   2
10127  051400  000401                          BR      9$
10128  051402  104002                          ERROR   2
10129  051404                          9$:
10130
10131                                  ;MODF TEST WITH EXPONENT OF THE RESULT = 0
10132  051404                          GGG11:
10133  051404  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
10134  051406  004737  051650                  JSR     PC,@#MODFSUB
10135  051412  040177  177777          1$:     .WORD   40177,-1         ;AC
10136  051416  040200  000000          2$:     .WORD   40200,0          ;FSRC
10137  051422  040177  177777          3$:     .WORD   40177,-1         ;FRACTIONAL RES.
10138  051426  000000  000000          4$:     .WORD   0,0              ;INTEGER RES.
10139  051432  000000  000000          5$:     .WORD   0,0              ;ERROR FRACTIONAL RES.
10140  051436  040177  177777          6$:     .WORD   40177,-1         ;ERROR INTEGER RES.
10141  051442  000017                  7$:     17                       ;FPS BEFORE EXECUTION.
10142  051444  000000                          0                        ;FPS AFTER EXECUTION.
10143  051446  104002                  8$:     ERROR   2                ;ST 041 TO 046 INTO 246.
10144  051450  000401                          BR      9$
10145  051452  104002                          ERROR   2
10146  051454                          9$:
10147
10148                                  ;MODF TEST WITH EXPONENT OF THE RESULT = -15
10149  051454                          GGG12:
10150  051454  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
10151  051456  004737  051650                  JSR     PC,@#MODFSUB
10152  051462  034377  177777          1$:     .WORD   34377,-1         ;AC
10153  051466  040200  000000          2$:     .WORD   40200,0          ;FSRC
10154  051472  034377  177777          3$:     .WORD   34377,-1         ;FRACTIONAL RES.
10155  051476  000000  000000          4$:     .WORD   0,0              ;INTEGER RES.
10156  051502  000000  000000          5$:     .WORD   0,0              ;ERROR FRACTIONAL RES.
10157  051506  034377  177777          6$:     .WORD   34377,-1         ;ERROR INTEGER RES.
10158  051512  000000                  7$:     0                        ;FPS BEFORE EXECUTION.
10159  051514  000000                          0                        ;FPS AFTER EXECUTION.
10160  051516  104002                  8$:     ERROR   2
10161  051520  000401                          BR      9$
10162  051522  104002                          ERROR   2
10163  051524                          9$:
10164
10165                                  ;MODF TEST WITH EXPONENT OF RESULT = -64, IN ROUND MODE
10166  051524                          GGG13:
10167  051524  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
10168  051526  004737  051650                  JSR     PC,@#MODFSUB
10169  051532  020000  000001          1$:     .WORD   20000,1          ;AC
10170  051536  040300  000000          2$:     .WORD   40300,0          ;FSRC
10171  051542  020100  000002          3$:     .WORD   20100,2          ;FRACTIONAL RES.
10172  051546  000000  000000          4$:     .WORD   0,0              ;INTEGER RES.
10173  051552  020100  000001          5$:     .WORD   20100,1          ;ERROR FRACTIONAL RES.
10174  051556  000000  000000          6$:     .WORD   0,0              ;ERROR INTEGER RES.
```

```
10175  051562  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
10176  051564  000000                          0                       ;FPS AFTER EXECUTION.
10177  051566  104002                  8$:     ERROR   2               ;ROUND TRUNK, ST 126 INTO ROUND.
10178  051570  000401                          BR      9$
10179  051572  104002                          ERROR   2
10180  051574                          9$:
10181
10182                                  ;MODF TEST WITH EXPONENT OF RESULT = 11
10183  051574                          GGG14:
10184  051574  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10185  051576  004737  051650                  JSR     PC,@#MODFSUB
10186  051602  142777  170000          1$:     .WORD   142777,170000   ;AC
10187  051606  040200  000000          2$:     .WORD   40200,0         ;FSRC
10188  051612  140000  000000          3$:     .WORD   140000,0        ;FRACTIONAL RES.
10189  051616  142777  160000          4$:     .WORD   142777,160000   ;INTEGER RES.
10190  051622  040000  000000          5$:     .WORD   40000,0         ;ERROR FRACTIONAL RES.
10191  051626  042777  160000          6$:     .WORD   42777,160000    ;ERROR INTEGER RES.
10192  051632  000007                  7$:     7                       ;FPS BEFORE EXECUTION.
10193  051634  000010                          10                      ;FPS AFTER EXECUTION.
10194  051636  104002                  8$:     ERROR   2               ;SIGN OF FRACTION.
10195  051640  000401                          BR      9$
10196  051642  104002                          ERROR   2               ;SIGN OF INTEGER.
10197  051644  000167  000366          9$:     JMP     GGGDONE         ;GO TO NEXT TEST.
10198
10199
10200                                  ;THIS SUBROUTINE, MODFSUB, IS CALLED TO SETUP THE
10201                                  ;OPERANDS, EXECUTE THE MODF INSTRUCTION AND CHECK THE RESULTS.
10202                                  ;IT IS CALLED THUS:
10203                                  ;
10204                                  ;               ACARG:  .WORD   X,X             ;AC OPERAND
10205                                  ;               FSRCARG:.WORD   X,X             ;FSRC OPERAND
10206                                  ;               FRES:   .WORD   X,X             ;FRACTIONAL RESULT
10207                                  ;               INTRES: .WORD   X,X             ;INTEGER RESULT
10208                                  ;               ERFRES: .WORD   X,X             ;ERROR FRACTION RESULT
10209                                  ;               ERINTRES:.WORD  X,X             ;ERROR INTEGER RESULT
10210                                  ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
10211                                  ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
10212                                  ;               ERR1:   ERROR   X               ;FRACTION ERROR
10213                                  ;                       BR      CONT
10214                                  ;               ERR2:   ERROR   X               ;INTEGER ERROR
10215                                  ;               CONT:                           ;RETURN ADDRESS
10216                                  ;
10217                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODF
10218                                  ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
10219                                  ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
10220                                  ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
10221                                  ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
10222                                  ;THEN MODFSUB WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
10223                                  ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
10224                                  ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
10225                                  ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
10226                                  ;FAILURE MATCHES THE TRUE RESULT THEN  MODFSUB PASSES CONTROL TO THE
10227                                  ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
10228                                  ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
10229                                  ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
10230                                  ;IF A MATCH IS MADE HOWEVER, MODFSUB WILL RETURN CONTROL TO THE ERROR
```

```
10231                                   ;CALL AT ERR2.
10232
10233  051650  012601                   MODFSUB:    MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
10234  051652  012700  000200                       MOV     #200,R0         ;SET FD MODE.
10235  051656  170100                             LDFPS   R0
10236  051660  010100                             MOV     R1,R0           ;SET UP AC0
10237  051662  172410                             LDD     (R0),AC0
10238  051664  012700  052226                     MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
10239  051670  172510                             LDD     (R0),AC1
10240  051672  016100  000030                     MOV     30(R1),R0       ;SET UP THE FPS.
10241  051676  170100                             LDFPS   R0
10242  051700  012737  051714  001236             MOV     #1$,@#$TMP2
10243  051706  010100                             MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
10244  051710  062700  000004                     ADD     #4,R0
10245
10246  051714  171410                   1$:       MODF    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
10247
10248  051716  170204                             STFPS   R4              ;GET THE FPS.
10249  051720  012700  000200                     MOV     #200,R0         ;SET FD MODE.
10250  051724  170100                             LDFPS   R0
10251  051726  012700  052206                     MOV     #MODFT0,R0      ;GET THE FRACTIONAL RESULT.
10252  051732  174010                             STD     AC0,(R0)
10253  051734  012700  052216                     MOV     #MODFT1,R0      ;GET THE INTEGER RESULT.
10254  051740  174110                             STD     AC1,(R0)
10255
10256  051742  010102                             MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
10257  051744  010237  001240                     MOV     R2,@#$TMP3
10258  051750  062702  000004                     ADD     #4,R2
10259  051754  010237  001242                     MOV     R2,@#$TMP4
10260  051760  062702  000004                     ADD     #4,R2
10261  051764  010237  001244                     MOV     R2,@#$TMP5
10262  051770  062702  000004                     ADD     #4,R2
10263  051774  010237  001246                     MOV     R2,@#$TMP6
10264  052000  012737  052206  001250             MOV     #MODFT0,@#$TMP7
10265  052006  012737  052216  001252             MOV     #MODFT1,@#$TMP10
10266  052014  010437  001254                     MOV     R4,@#$TMP11
10267  052020  016137  000032  001256             MOV     32(R1),@#$TMP12
10268
10269  052026  012702  052206                     MOV     #MODFT0,R2      ;CHECK THE FRACTIONAL RESULT.
10270  052032  026112  000010                     CMP     10(R1),(R2)
10271  052036  001022                             BNE     10$             ;BRANCH IF INCORRECT.
10272  052040  026162  000012  000002             CMP     12(R1),2(R2)
10273  052046  001016                             BNE     10$
10274
10275  052050  012702  052216                     MOV     #MODFT1,R2      ;CHECK THE INTEGER RESULT.
10276  052054  026112  000014                     CMP     14(R1),(R2)
10277  052060  001026                             BNE     15$             ;BRANCH IF INCORRECT.
10278  052062  026162  000016  000002             CMP     16(R1),2(R2)
10279  052070  001022                             BNE     15$
10280
10281  052072  026104  000032                     CMP     32(R1),R4       ;CHECK THE FPS.
10282  052076  001034                             BNE     20$             ;BRANCH IF INCORRECT.
10283
10284  052100  000161  000042           9$:       JMP     42(R1)          ;RETURN.
10285
10286                                   ;FRACTIONAL ERROR.
```

```
10287  052104  026112  000020          10$:    CMP     20(R1),(R2)     ;WAS THE ERROR ANTICIPATED?
10288  052110  001010                          BNE     11$             ;BRANCH IF NOT ANTICIPATED.
10289  052112  026162  000022  000002          CMP     22(R1),2(R2)
10290  052120  001004                          BNE     11$
10291  052122  010102                          MOV     R1,R2           ;THE ERROR WAS ANTICIPATED SO
10292  052124  062702  000034                  ADD     #34,R2          ;RETURN TO THE ERROR REPORT AT THE
10293                                                                  ;CALLING ROUTINE.
10294  052130  000112                          JMP     (R2)
10295
10296  052132                          11$:                            ;THE ERROR WAS NOT ANTICIPATED SO
10297  052132  104002                  12$:    ERROR   2               ;REPORT THE INCORRECT FRACTION HERE.
10298  052134  000761                          BR      9$
10299
10300                                   ;INTEGER ERROR.
10301  052136  026112  000024          15$:    CMP     24(R1),(R2)     ;WAS THIS ERROR ANTICIPATED?
10302  052142  001010                          BNE     16$             ;BRANCH IF NOT.
10303  052144  026162  000026  000002          CMP     26(R1),2(R2)
10304  052152  001004                          BNE     16$
10305  052154  010102                          MOV     R1,R2
10306  052156  062702  000040                  ADD     #40,R2          ;THE ERROR WAS ANTICIAPTED SO RETURN
10307                                                                  ;TO THE ERROR REPORT IN THE CALLING
10308  052162  000112                          JMP     (R2)            ;ROUTINE.
10309
10310  052164                          16$:                            ;THE ERROR WAS NOT ANTICIPATED SO REPORT
10311  052164  104002                  17$:    ERROR   2               ;THE INTEGER FAILURE HERE.
10312  052166  000744                          BR      9$
10313
10314                                   ;FPS INCORRECT.
10315  052170  010437  001254          20$:    MOV     R4,@#$TMP11     ;REPORT INCORRECT FPS.
10316  052174  016137  000032  001256          MOV     32(R1),@#$TMP12
10317  052202  104002                  21$:    ERROR   2
10318  052204  000735                          BR      9$
10319
10320  052206  000000  000000  000000  MODFT0: .WORD   0,0,0,0
10321  052214  000000
10322
10323  052216  000000  000000  000000  MODFT1: .WORD   0,0,0,0
10324  052224  000000
10325
10326  052226  177777  177777  177777  MODP1:  .WORD   -1,-1,-1,-1
10327  052234  177777
10328
10329  052236                          GGGDONE:
10330  052236  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
10331                                                                  ;SEE IF THE USER HAS EXPRESSED
10332                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
10333                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
10334                                                                  ;THE USER TYPED CONTROL G?).
10335
10336
10337
10338
10339                                   ;;*******************************************************************
10340                                   ;*TEST 55        MODD TEST
10341                                   ;*
10342                                   ;*THIS IS A TEST OF THE MODD INSTRUCTION. IT MAKES USE OF A SUBROUTINE
```

```
10343                                   ;*TO SET UP THE ARGUMENTS, EXECUTE THE INSTRUCTION AND CHECK THE
10344                                   ;*RESULTS.
10345                                   ;*
10346                                   ;;*****************************************************************
10347  052240  000004                   TST55:  SCOPE
10348
10349                                   ;MODD WITH (FSRC=AC=0)
10350  052242                           HHH1:
10351  052242  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10352  052244  004737  053746                   JSR     PC,@#MODDSUB
10353  052250  000000  000000  000000  1$:      .WORD   0,0,0,0         ;AC
10354  052256  000000
10355  052260  000000  000000  000000  2$:      .WORD   0,0,0,0         ;FSRC
10356  052266  000000
10357  052270  000000  000000  000000  3$:      .WORD   0,0,0,0         ;FRACTIONAL RES.
10358  052276  000000
10359  052300  000000  000000  000000  4$:      .WORD   0,0,0,0         ;INTEGER RES.
10360  052306  000000
10361  052310  000000  000000  000000  5$:      .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
10362  052316  000000
10363  052320  000000  000000  177777  6$:      .WORD   0,0,-1,-1       ;ERROR INTEGER RES.
10364  052326  177777
10365  052330  000200                   7$:      200                     ;FPS BEFORE EXECUTION.
10366  052332  000204                            204                     ;FPS AFTER EXECUTION.
10367  052334  104002                   8$:      ERROR   2
10368  052336  000401                            BR      9$
10369  052340  104002                            ERROR   2               ;ST 231 TO 142 INTO 143
10370  052342                           9$:
10371
10372                                   ;MODD TEST WITH FSRC=0
10373  052342                           HHH2:
10374  052342  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10375  052344  004737  053746                   JSR     PC,@#MODDSUB
10376  052350  012345  067012           1$:     .WORD   012345,67012    ;AC
10377  052354  034567  012345                   .WORD   34567,012345
10378  052360  000000  000000  000000  2$:      .WORD   0,0,0,0         ;FSRC
10379  052366  000000
10380  052370  000000  000000  000000  3$:      .WORD   0,0,0,0         ;FRACTIONAL RES.
10381  052376  000000
10382  052400  000000  000000  000000  4$:      .WORD   0,0,0,0         ;INTEGER RES.
10383  052406  000000
10384  052410  012345  067012           5$:     .WORD   012345,67012    ;ERROR FRACTIONAL RES.
10385  052414  034567  012345                   .WORD   34567,012345
10386  052420  177777  177777  177777  6$:      .WORD   -1,-1,-1,-1     ;ERROR INTEGER RES.
10387  052426  177777
10388  052430  000213                   7$:      213                     ;FPS BEFORE EXECUTION.
10389  052432  000204                            204                     ;FPS AFTER EXECUTION.
10390  052434  104002                   8$:      ERROR   2               ;STORE DOUBLE ZERO
10391  052436  000401                            BR      9$
10392  052440  104002                            ERROR   2               ;AC V 1 <= ZERO ST 143
10393  052442                           9$:
10394
10395                                   ;MODD TEST WITH (AC=0)
10396  052442                           HHH3:
10397  052442  104414                           LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10398  052444  004737  053746                   JSR     PC,@#MODDSUB
```

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10399  052450  000000  000000  000000  1$:     .WORD   0,0,0,0          ;AC
10400  052456  000000
10401  052460  072727  127272          2$:     .WORD   72727,127272     ;FSRC
10402  052464  072727  127272                  .WORD   72727,127272
10403  052470  000000  000000  000000  3$:     .WORD   0,0,0,0          ;FRACTIONAL RES.
10404  052476  000000
10405  052500  000000  000000  000000  4$:     .WORD   0,0,0,0          ;INTEGER RES.
10406  052506  000000
10407  052510  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1      ;ERROR FRACTIONAL RES.
10408  052516  177777
10409  052520  177777  177777  177777  6$:     .WORD   -1,-1,-1,-1      ;ERROR INTEGER RES.
10410  052526  177777
10411  052530  000213                  7$:     213                      ;FPS BEFORE EXECUTION.
10412  052532  000204                          204                      ;FPS AFTER EXECUTION.
10413  052534  104002                  8$:     ERROR   2
10414  052536  000401                          BR      9$
10415  052540  104002                          ERROR   2
10416  052542                          9$:
10417
10418                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 57
10419  052542                          HHH4:
10420  052542  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
10421  052544  004737  053746                  JSR     PC,@#MODDSUB
10422  052550  056252  125252          1$:     .WORD   56252,125252     ;AC
10423  052554  125252  125250                  .WORD   125252,125250
10424  052560  040300  000000  000000  2$:     .WORD   40300,0,0,0      ;FSRC
10425  052566  000000
10426  052570  000000  000000  000000  3$:     .WORD   0,0,0,0          ;FRACTIONAL RES.
10427  052576  000000
10428  052600  056377  177777  177777  4$:     .WORD   56377,-1,-1,-4   ;INTEGER RES.
10429  052606  177774
10430  052610  000000  000000          5$:     .WORD   0,0              ;ERROR FRACTIONAL RES.
10431  052614  125252  125252                  .WORD   125252,125252
10432  052620  056377  177777  177777  6$:     .WORD   56377,-1,-1,-1   ;ERROR INTEGER RES.
10433  052626  177777
10434  052630  000213                  7$:     213                      ;FPS BEFORE EXECUTION.
10435  052632  000204                          204                      ;FPS AFTER EXECUTION.
10436  052634  104002                  8$:     ERROR   2                ;ST 526 TO 134 INTO 135
10437  052636  000401                          BR      9$
10438  052640  104002                          ERROR   2
10439  052642                          9$:
10440
10441                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 79
10442  052642                          HHH5:
10443  052642  104414                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
10444  052644  004737  053746                  JSR     PC,@#MODDSUB
10445  052650  140240  000000  000000  1$:     .WORD   140240,0,0,0     ;AC
10446  052656  000000
10447  052660  063714  146314          2$:     .WORD   63714,146314     ;FSRC
10448  052664  133572  167737                  .WORD   133572,167737
10449  052670  000000  000000  000000  3$:     .WORD   0,0,0,0          ;FRACTIONAL RES.
10450  052676  000000
10451  052700  163777  177777          4$:     .WORD   163777,-1        ;INTEGER RES.
10452  052704  162531  125726                  .WORD   162531,125726
10453  052710  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1      ;ERROR FRACTIONAL RES.
10454  052716  177777
```

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10455  052720  063777  177777          6$:     .WORD   63777,-1          ;ERROR INTEGER RES.
10456  052724  162531  125726                  .WORD   162531,125726
10457  052730  000210                  7$:     210                     ;FPS BEFORE EXECUTION.
10458  052732  000204                          204                     ;FPS AFTER EXECUTION.
10459  052734  104002                  8$:     ERROR   2
10460  052736  000401                          BR      9$
10461  052740  104002                          ERROR   2               ;ST 526 BAD SIGN
10462  052742                          9$:
10463
10464                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 57
10465  052742                          HHH6:
10466  052742  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10467  052744  004737  053746                  JSR     PC,@#MODDSUB
10468  052750  056200  000000  000000  1$:     .WORD   56200,0,0,1     ;AC
10469  052756  000001
10470  052760  040340  000000  000000  2$:     .WORD   40340,0,0,0     ;FSRC
10471  052766  000000
10472  052770  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
10473  052776  000000
10474  053000  056340  000000  000000  4$:     .WORD   56340,0,0,1     ;INTEGER RES.
10475  053006  000001
10476  053010  040000  000000  000000  5$:     .WORD   40000,0,0,0     ;ERROR FRACTIONAL RES.
10477  053016  000000
10478  053020  056340  000000  000000  6$:     .WORD   56340,0,0,1     ;ERROR INTEGER RES.
10479  053026  000001
10480  053030  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
10481  053032  000204                          204                     ;FPS AFTER EXECUTION.
10482  053034  104002                  8$:     ERROR   2               ;CONSTANT BAD (NOT 56)
10483                                                                  ;OR ST 525 TO 050 INTO 150
10484  053036  000401                          BR      9$
10485  053040  104002                          ERROR   2
10486  053042                          9$:
10487
10488                                  ;MODD TEST WITH EXPONENT OF THE RESULT = 56
10489  053042                          HHH7:
10490  053042  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10491  053044  004737  053746                  JSR     PC,@#MODDSUB
10492  053050  056000  000000  000000  1$:     .WORD   56000,0,0,1     ;AC
10493  053056  000001
10494  053060  040340  000000  000000  2$:     .WORD   40340,0,0,0     ;FSRC
10495  053066  000000
10496  053070  040100  000000  000000  3$:     .WORD   40100,0,0,0     ;FRACTIONAL RES.
10497  053076  000000
10498  053100  056140  000000  000000  4$:     .WORD   56140,0,0,1     ;INTEGER RES.
10499  053106  000001
10500  053110  000000  000000  000000  5$:     .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
10501  053116  000000
10502  053120  056140  000000  000000  6$:     .WORD   56140,0,0,1     ;ERROR INTEGER RES.
10503  053126  000001
10504  053130  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
10505  053132  000200                          200                     ;FPS AFTER EXECUTION.
10506  053134  104002                  8$:     ERROR   2               ;BAD CONSTANT (NOT 56) OR
10507                                                                  ;ST 525 TO 150 INTO 050
10508  053136  000401                          BR      9$
10509  053140  104002                          ERROR   2
10510  053142                          9$:
```

```
10511
10512                                          ;MODD TEST WITH EXPONENT OF THE RESULT = 36
10513  053142                                  HHH8:
10514  053142  104414                                  LPERR                          ;SET UP THE LOOP ON ERROR ADDRESS.
10515  053144  004737  053746                          JSR     PC,@#MODDSUB
10516  053150  051177  177777  177777  1$:     .WORD   51177,-1,-1,-1         ;AC
10517  053156  177777
10518  053160  040200  000000  000000  2$:     .WORD   40200,0,0,0            ;FSRC
10519  053166  000000
10520  053170  040177  177760  000000  3$:     .WORD   40177,-20,0,0          ;FRACTIONAL RES.
10521  053176  000000
10522  053200  051177  177777  177760  4$:     .WORD   51177,-1,-20,0         ;INTEGER RES.
10523  053206  000000
10524  053210  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1            ;ERROR FRACTIONAL RES.
10525  053216  177777
10526  053220  177777  177777  177777  6$:     .WORD   -1,-1,-1,-1            ;ERROR INTEGER RES.
10527  053226  177777
10528  053230  000217                          7$:     217                            ;FPS BEFORE EXECUTION.
10529  053232  000200                                  200                            ;FPS AFTER EXECUTION.
10530  053234  104002                          8$:     ERROR   2
10531  053236  000401                                  BR      9$
10532  053240  104002                                  ERROR   2
10533  053242                                  9$:
10534
10535                                          ;MODD TEST WITH EXPONENT OF THE RESULT = 30
10536  053242                                  HHH9:
10537  053242  104414                                  LPERR                          ;SET UP THE LOOP ON ERROR ADDRESS.
10538  053244  004737  053746                          JSR     PC,@#MODDSUB
10539  053250  040200  000000  000000  1$:     .WORD   40200,0,0,0            ;AC
10540  053256  000000
10541  053260  047577  177777                  2$:     .WORD   47577,-1               ;FSRC
10542  053264  176000  000001                          .WORD   176000,1
10543  053270  031600  000000  000000  3$:     .WORD   31600,0,0,0            ;FRACTIONAL RES.
10544  053276  000000
10545  053300  047577  177777                  4$:     .WORD   47577,-1               ;INTEGER RES.
10546  053304  176000  000000                          .WORD   176000,0
10547  053310  000000  000000  000000  5$:     .WORD   0,0,0,0                ;ERROR FRACTIONAL RES.
10548  053316  000000
10549  053320  047577  177777  177777  6$:     .WORD   47577,-1,-1,-1         ;ERROR INTEGER RES.
10550  053326  177777
10551  053330  000200                          7$:     200                            ;FPS BEFORE EXECUTION.
10552  053332  000200                                  200                            ;FPS AFTER EXECUTION.
10553  053334  104002                          8$:     ERROR   2                      ;(NORMALIZE) ST 532 TO 122
10554                                                                                 ;INTO NORM.
10555  053336  000401                                  BR      9$
10556  053340  104002                                  ERROR   2                      ;AC V 1 <= X14
10557                                                                                 ;OR ST 733 TO 156 INTO 157.
10558  053342                                  9$:
10559
10560                                          ;MODD TEST WITH EXPONENT OF THE RESULT = 31
10561  053342                                  HHH10:
10562  053342  104414                                  LPERR                          ;SET UP THE LOOP ON ERROR ADDRESS.
10563  053344  004737  053746                          JSR     PC,@#MODDSUB
10564  053350  047777  177777                  1$:     .WORD   47777,-1               ;AC
10565  053354  177000  000000                          .WORD   177000,0
10566  053360  040200  000000  000000  2$:     .WORD   40200,0,0,0            ;FSRC
```

```
10567  053366  000000
10568  053370  000000  000000  000000  3$:     .WORD   0,0,0,0          ;FRACTIONAL RES.
10569  053376  000000
10570  053400  047777  177777          4$:     .WORD   47777,-1         ;INTEGER RES.
10571  053404  177000  000000                  .WORD   177000,0
10572  053410  000000  000000  177000  5$:     .WORD   0,0,177000,0     ;ERROR FRACTIONAL RES.
10573  053416  000000
10574  053420  177777  177777  177777  6$:     .WORD   -1,-1,-1,-1      ;ERROR INTEGER RES.
10575  053426  177777
10576  053430  000213          7$:     213                              ;FPS BEFORE EXECUTION.
10577  053432  000204                  204                              ;FPS AFTER EXECUTION.
10578  053434  104002          8$:     ERROR   2                        ;(BUT FD) STORE X10
10579  053436  000401                  BR      9$
10580  053440  104002                  ERROR   2
10581  053442          9$:
10582
10583                           ;MODD TEST WITH EXPONENT OF THE RESULT = 0
10584  053442                   HHH11:
10585  053442  104414                  LPERR                            ;SET UP THE LOOP ON ERROR ADDRESS.
10586  053444  004737  053746          JSR     PC,@#MODDSUB
10587  053450  040200  000000  000000  1$:     .WORD   40200,0,0,0      ;AC
10588  053456  000000
10589  053460  040177  072727          2$:     .WORD   40177,72727      ;FSRC
10590  053464  127272  072727                  .WORD   127272,72727
10591  053470  040177  072727          3$:     .WORD   40177,72727      ;FRACTIONAL RES.
10592  053474  127272  072727                  .WORD   127272,72727
10593  053500  000000  000000  000000  4$:     .WORD   0,0,0,0          ;INTEGER RES.
10594  053506  000000
10595  053510  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1      ;ERROR FRACTIONAL RES.
10596  053516  177777
10597  053520  000000  000000  177777  6$:     .WORD   0,0,-1,-1        ;ERROR INTEGER RES.
10598  053526  177777
10599  053530  000200          7$:     200                              ;FPS BEFORE EXECUTION.
10600  053532  000200                  200                              ;FPS AFTER EXECUTION.
10601  053534  104002          8$:     ERROR   2
10602  053536  000401                  BR      9$
10603  053540  104002                  ERROR   2                        ;ST 246 TO 126 INTO 127 (BUT FD)
10604  053542          9$:
10605
10606                           ;MODD TEST WITH EXPONENT OF THE RESULT = -115
10607  053542                   HHH12:
10608  053542  104414                  LPERR                            ;SET UP THE LOOP ON ERROR ADDRESS.
10609  053544  004737  053746          JSR     PC,@#MODDSUB
10610  053550  003377  177777          1$:     .WORD   3377,-1          ;AC
10611  053554  177777  052525                  .WORD   -1,52525
10612  053560  040200  000000  000000  2$:     .WORD   40200,0,0,0      ;FSRC
10613  053566  000000
10614  053570  003377  177777          3$:     .WORD   3377,-1          ;FRACTIONAL RES.
10615  053574  177777  052525                  .WORD   -1,52525
10616  053600  000000  000000  000000  4$:     .WORD   0,0,0,0          ;INTEGER RES.
10617  053606  000000
10618  053610  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1      ;ERROR FRACTIONAL RES.
10619  053616  177777
10620  053620  000000  000000  177777  6$:     .WORD   0,0,-1,-1        ;ERROR INTEGER RES.
10621  053626  177777
10622  053630  000200          7$:     200                              ;FPS BEFORE EXECUTION.
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10623  053632  000200                          200                     ;FPS AFTER EXECUTION.
10624  053634  104002                  8$:     ERROR   2
10625  053636  000401                          BR      9$
10626  053640  104002                          ERROR   2               ;ST 446 TO 126 INTO 127 (BUT FD)
10627  053642                          9$:
10628
10629                                  ;MODD TEST WITH EXPONENT OF THE RESULT = -63, IN ROUND MODE.
10630  053642                          HHH13:
10631  053642  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10632  053644  004737  053746                  JSR     PC,@#MODDSUB
10633  053650  040300  000000  000000  1$:     .WORD   40300,0,0,0     ;AC
10634  053656  000000
10635  053660  020200  000000  000000  2$:     .WORD   20200,0,0,1     ;FSRC
10636  053666  000001
10637  053670  020300  000000  000000  3$:     .WORD   20300,0,0,2     ;FRACTIONAL RES.
10638  053676  000002
10639  053700  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
10640  053706  000000
10641  053710  000000  000000  177777  5$:     .WORD   0,0,-1,-1       ;ERROR FRACTIONAL RES.
10642  053716  177777
10643  053720  177777  177777  177777  6$:     .WORD   -1,-1,-1,-1     ;ERROR INTEGER RES.
10644  053726  177777
10645  053730  000200                  7$:     200                     ;FPS BEFORE EXECUTION.
10646  053732  000200                          200                     ;FPS AFTER EXECUTION.
10647  053734  104002                  8$:     ERROR   2               ;ST 127 INTO RND/TR
10648  053736  000401                          BR      9$
10649  053740  104002                          ERROR   2
10650  053742  000137  054344          9$:     JMP     @#HHHDONE       ;GO TO THE NEXT TEST.
10651
10652                                  ;THIS SUBROUTINE, MODDSUB, IS CALLED TO SETUP THE
10653                                  ;OPERANDS, EXECUTE THE MODD INSTRUCTION AND CHECK THE RESULTS.
10654                                  ;IT IS CALLED THUS:
10655                                  ;
10656                                  ;               ACARG:   .WORD   X,X,X,X         ;AC OPERAND
10657                                  ;               FSRCARG:.WORD    X,X,X,X         ;FSRC OPERAND
10658                                  ;               FRES:    .WORD   X,X,X,X         ;FRACTIONAL RESULT
10659                                  ;               INTRES:  .WORD   X,X,X,X         ;INTEGER RESULT
10660                                  ;               ERFRES:  .WORD   X,X,X,X         ;ERROR FRACTION RESULT
10661                                  ;               ERINTRES:.WORD   X,X,X,X         ;ERROR INTEGER RESULT
10662                                  ;               FPSB:    .WORD   X               ;FPS BEFORE EXECUTION
10663                                  ;               FPSA:    .WORD   X               ;FPS AFTER EXECUTION
10664                                  ;               ERR1:    ERROR   X               ;FRACTION ERROR
10665                                  ;                        BR      CONT
10666                                  ;               ERR2:    ERROR   X               ;INTEGER ERROR
10667                                  ;               CONT:                            ;RETURN ADDRESS
10668                                  ;
10669                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODD
10670                                  ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
10671                                  ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
10672                                  ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
10673                                  ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
10674                                  ;THEN MODDSUB WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
10675                                  ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
10676                                  ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
10677                                  ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
10678                                  ;FAILURE MATCHES THE TRUE RESULT THEN  MODDSUB PASSES CONTROL TO THE
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10679                                   ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
10680                                   ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
10681                                   ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
10682                                   ;IF A MATCH IS MADE HOWEVER, MODDSUB WILL RETURN CONTROL TO THE ERROR
10683                                   ;CALL AT ERR2.
10684
10685  053746  012601                   MODDSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
10686  053750  012700  000200                   MOV     #200,R0         ;SET FD MODE.
10687  053754  170100                           LDFPS   R0
10688  053756  010100                           MOV     R1,R0           ;SET UP AC0
10689  053760  172410                           LDD     (R0),AC0
10690  053762  012700  052226                   MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
10691  053766  172510                           LDD     (R0),AC1
10692  053770  016100  000060                   MOV     60(R1),R0       ;SET UP THE FPS.
10693  053774  170100                           LDFPS   R0
10694  053776  012737  054012  001236           MOV     #1$,@#$TMP2
10695  054004  010100                           MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
10696  054006  062700  000010                   ADD     #10,R0
10697
10698  054012  171410                   1$:     MODD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
10699
10700  054014  170204                           STFPS   R4              ;GET THE FPS.
10701  054016  012700  000200                   MOV     #200,R0         ;SET FD MODE.
10702  054022  170100                           LDFPS   R0
10703  054024  012700  054324                   MOV     #MODDT0,R0      ;GET THE FRACTIONAL RESULT.
10704  054030  174010                           STD     AC0,(R0)
10705  054032  012700  054334                   MOV     #MODDT1,R0      ;GET THE INTEGER RESULT.
10706  054036  174110                           STD     AC1,(R0)
10707
10708  054040  010102                           MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
10709  054042  010237  001240                   MOV     R2,@#$TMP3
10710  054046  062702  000010                   ADD     #10,R2
10711  054052  010237  001242                   MOV     R2,@#$TMP4
10712  054056  062702  000010                   ADD     #10,R2
10713  054062  010237  001244                   MOV     R2,@#$TMP5
10714  054066  062702  000010                   ADD     #10,R2
10715  054072  010237  001246                   MOV     R2,@#$TMP6
10716  054076  012737  054324  001250           MOV     #MODDT0,@#$TMP7
10717  054104  012737  054334  001252           MOV     #MODDT1,@#$TMP10
10718  054112  016137  000062  001256           MOV     62(R1),@#$TMP12
10719  054120  010437  001254                   MOV     R4,@#$TMP11
10720
10721  054124  012702  054324                   MOV     #MODDT0,R2      ;CHECK THE FRACTIONAL RESULT.
10722  054130  010103                           MOV     R1,R3
10723  054132  062703  000020                   ADD     #20,R3
10724  054136  012705  000004                   MOV     #4,R5
10725  054142  022223                   2$:     CMP     (R2)+,(R3)+
10726  054144  001020                           BNE     10$             ;BRANCH IF INCORRECT.
10727  054146  077503                           SOB     R5,2$
10728
10729  054150  012702  054334                   MOV     #MODDT1,R2      ;CHECK THE INTEGER RESULT.
10730  054154  010103                           MOV     R1,R3
10731  054156  062703  000030                   ADD     #30,R3
10732  054162  012705  000004                   MOV     #4,R5
10733  054166  022223                   3$:     CMP     (R2)+,(R3)+
10734  054170  001026                           BNE     15$             ;BRANCH IF INCORRECT.
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10735  054172  077503                          SOB     R5,3$
10736
10737
10738  054174  026104  000062                  CMP     62(R1),R4       ;CHECK THE FPS.
10739  054200  001042                          BNE     20$             ;BRANCH IF INCORRECT.
10740
10741  054202  000161  000072          9$:     JMP     72(R1)          ;RETURN.
10742
10743                                  ;FRACTIONAL ERROR.
10744  054206  012702  054324          10$:    MOV     #MODDT0,R2      ;WAS THE FRACTIONAL ERROR ANTICIPATED?
10745  054212  010103                          MOV     R1,R3
10746  054214  062703  000040                  ADD     #40,R3
10747  054220  012705  000004                  MOV     #4,R5
10748  054224  022223                  50$:    CMP     (R2)+,(R3)+
10749  054226  001005                          BNE     11$             ;BRANCH IF NOT ANTICIPATED.
10750  054230  077503                          SOB     R5,50$
10751  054232  010102                          MOV     R1,R2           ;THE ERROR WAS ANTICIPATED SO
10752  054234  062702  000064                  ADD     #64,R2          ;RETURN TO THE ERROR REPORT AT THE
10753                                                                  ;CALLING ROUTINE.
10754  054240  000112                          JMP     (R2)
10755
10756  054242                          11$:                            ;THE ERROR WAS NOT ANTICIPATED SO
10757  054242  104002                  12$:    ERROR   2               ;REPORT THE INCORRECT FRACTION HERE.
10758  054244  000756                          BR      9$
10759
10760                                  ;INTEGER ERROR.
10761  054246  012702  054334          15$:    MOV     #MODDT1,R2      ;WAS THE INTEGER ERROR ANTICIPATED?
10762  054252  010103                          MOV     R1,R3
10763  054254  062703  000050                  ADD     #50,R3
10764  054260  012705  000004                  MOV     #4,R5
10765  054264  022223                  60$:    CMP     (R2)+,(R3)+
10766  054266  001005                          BNE     17$             ;BRANCH IF NOT ANTICIPATED.
10767  054270  077503                          SOB     R5,60$
10768  054272  010102                          MOV     R1,R2           ;THE ERROR WAS ANTICIAPTED SO RETURN
10769  054274  062702  000070                  ADD     #70,R2          ;TO THE ERROR REPORT IN THE CALLING
10770                                                                  ;ROUTINE.
10771  054300  000112                          JMP     (R2)
10772
10773  054302                          16$:                            ;THE ERROR WAS NOT ANTICIPATED SO REPORT
10774  054302  104002                  17$:    ERROR   2               ;THE INTEGER FAILURE HERE.
10775  054304  000736                          BR      9$
10776
10777                                  ;FPS INCORRECT.
10778  054306  010437  001254          20$:    MOV     R4,@#$TMP11     ;REPORT INCORRECT FPS.
10779  054312  016137  000062  001256          MOV     62(R1),@#$TMP12
10780  054320  104002                  21$:    ERROR   2
10781  054322  000727                          BR      9$
10782
10783  054324  000000  000000  000000  MODDT0: .WORD   0,0,0,0
10784  054332  000000
10785
10786  054334  000000  000000  000000  MODDT1: .WORD   0,0,0,0
10787  054342  000000
10788
10789  054344                          HHHDONE:
10790  054344  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
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                                                        ;SEE IF THE USER HAS EXPRESSED
                                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                        ;THE USER TYPED CONTROL G?).



                                        ;;*****************************************************************
                                        ;*TEST 56       UNDER\OVER FLOW, USING MODF WITH TRAPS DISABLED, TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE MODF OVERFLOW AND UNDERFLOW CONDITIONS. IT MAKES
                                        ;*USE OF A SUBROUTINE TO SETUP THE OPERANDS, EXECUTE THE MODF INSTRUCTION
                                        ;*AND CHECK THE RESULTS. TRAPS ARE DISABLED DURING THIS TEST.
                                        ;*
                                        ;;*****************************************************************
054346  000004                          TST56:  SCOPE

                                        ;UNDERFLOW TEST, WITH EXPONENT OF THE RESULT = -129, FIU = 1, FID = 1
054350                                  MMM1:
054350  104414                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
054352  004767  000320                          JSR     PC,MODFOV
054356  020123  045676                1$:     .WORD   20123,45676     ;AC
054362  020200  000000                2$:     .WORD   20200,0         ;FSRC
054366  000123  045676                3$:     .WORD   123,45676       ;FRACTIONAL RES.
054372  000000  000000                4$:     .WORD   0,0             ;INTEGER RES.
054376  177777  177777                5$:     .WORD   -1,-1           ;ERROR FRACTIONAL RES.
054402  177777  177777                6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
054406  042000                        7$:     42000                   ;FPS BEFORE EXECUTION.
054410  142004                                142004                  ;FPS AFTER EXECUTION.
054412  000012                                12                      ;FEC
054414  104002                        8$:     ERROR   2               ;FEC INCORRECT, UNDERFLOW.
054416  000401                                BR      9$
054420  104002                                ERROR   2               ;AC V 1 (2,3) <= ZERO, ST 126.
054422                                  9$:

                                        ;UNDERFLOW EXP OF RESULT = -193, FIU = 0, FID = 1
054422                                  MMM2:
054422  104414                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
054424  004737  054676                          JSR     PC,@#MODFOV
054430  010200  000000                1$:     .WORD   10200,0         ;AC
054434  010000  000000                2$:     .WORD   10000,0         ;FSRC
054440  000000  000000                3$:     .WORD   0,0             ;FRACTIONAL RES.
054444  000000  000000                4$:     .WORD   0,0             ;INTEGER RES.
054450  177777  177777                5$:     .WORD   -1,-1           ;ERROR FRACTIONAL RES.
054454  177777  177777                6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
054460  005013                        7$:     5013                    ;FPS BEFORE EXECUTION.
054462  005004                                5004                    ;FPS AFTER EXECUTION.
054464  000012                                12                      ;FEC
054466  000240                        8$:     NOP
054470  000401                                BR      9$
054472  104002                                ERROR   2
054474                                  9$:

                                        ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, FIV = 1, FID = 1
054474                                  MMM3:
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10847  054474  104414
10848  054476  004737  054676                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10849  054502  060052  125252                  JSR     PC,@#MODFOV
10850  054506  060200  000000          1$:     .WORD   60052,125252    ;AC
10851  054512  000000  000000          2$:     .WORD   60200,0         ;FSRC
10852  054516  000052  125252          3$:     .WORD   0,0             ;FRACTIONAL RES.
10853  054522  000000  000000          4$:     .WORD   52,125252       ;INTEGER RES.
10854  054526  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
10855  054532  041000                  6$:     .WORD   0,0             ;ERROR INTEGER RES.
10856  054534  141006                  7$:     41000                   ;FPS BEFORE EXECUTION.
10857  054536  000010                          141006                  ;FPS AFTER EXECUTION.
10858  054540  104002                          10                      ;FEC
10859  054542  000401                  8$:     ERROR   2               ;BAD FEC ON OVERFLOW.
10860  054544  104002                          BR      9$
10861                                           ERROR   2               ;ST 520 TO STORE ZERO TWICE
10862  054546                          9$:                             ;INTO 162
10863
10864                                   ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 130, FIV = 0, FID = 1
10865  054546                          MMM4:
10866  054546  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10867  054550  004737  054676                  JSR     PC,@#MODFOV
10868  054554  060345  067654          1$:     .WORD   60345,67654     ;AC
10869  054560  060200  000000          2$:     .WORD   60200,0         ;FSRC
10870  054564  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
10871  054570  000000  000000          4$:     .WORD   0,0             ;INTEGER RES.
10872  054574  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
10873  054600  000345  067654          6$:     .WORD   345,67654       ;ERROR INTEGER RES.
10874  054604  006011                  7$:     6011                    ;FPS BEFORE EXECUTION.
10875  054606  006006                          6006                    ;FPS AFTER EXECUTION.
10876  054610  000010                          10                      ;FEC
10877  054612  000240                  8$:     NOP
10878  054614  000401                          BR      9$
10879  054616  104002                          ERROR   2               ;ST 520 TO 162 INTO STORE ZERO TWICE.
10880  054620                          9$:
10881
10882                                   ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, RESULT NEGATIVE
10883                                   ;AND FIV = 1, FID = 1
10884  054620                          MMM5:
10885  054620  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
10886  054622  004737  054676                  JSR     PC,@#MODFOV
10887  054626  160252  125252          1$:     .WORD   160252,125252   ;AC
10888  054632  060000  000000          2$:     .WORD   60000,0         ;FSRC
10889  054636  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
10890  054642  100052  125252          4$:     .WORD   100052,125252   ;INTEGER RES.
10891  054646  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
10892  054652  000052  125252          6$:     .WORD   52,125252       ;ERROR INTEGER RES.
10893  054656  041000                  7$:     41000                   ;FPS BEFORE EXECUTION.
10894  054660  141006                          141006                  ;FPS AFTER EXECUTION.
10895  054662  000010                          10                      ;FEC
10896  054664  104002                  8$:     ERROR   2
10897  054666  000401                          BR      9$
10898  054670  104002                          ERROR   2               ;ST 517, BAD SIGN.
10899  054672  000137  055272          9$:     JMP     @#MMMDONE       ;GO TO THE NEXT TEST.
10900
10901                                   ;THIS SUBROUTINE, MODFOV, IS CALLED TO SETUP THE
10902                                   ;OPERANDS, EXECUTE THE MODF INSTRUCTION AND CHECK THE RESULTS.
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10903                                   ;IT IS CALLED THUS:
10904                                   ;
10905                                   ;       ACARG:   .WORD   X,X            ;AC OPERAND
10906                                   ;       FSRCARG: .WORD   X,X            ;FSRC OPERAND
10907                                   ;       FRES:    .WORD   X,X            ;FRACTIONAL RESULT
10908                                   ;       INTRES:  .WORD   X,X            ;INTEGER RESULT
10909                                   ;       ERFRES:  .WORD   X,X            ;ERROR FRACTION RESULT
10910                                   ;       ERINTRES:.WORD   X,X            ;ERROR INTEGER RESULT
10911                                   ;       FPSB:    .WORD   X              ;FPS BEFORE EXECUTION
10912                                   ;       FPSA:    .WORD   X              ;FPS AFTER EXECUTION
10913                                   ;       FEC:     .WORD   X              ;FEC
10914                                   ;       ERR1:    ERROR   X              ;FEC ERROR
10915                                   ;                BR      CONT
10916                                   ;       ERR2:    ERROR   X              ;INTEGER ERROR
10917                                   ;       CONT:                           ;RETURN ADDRESS
10918                                   ;
10919                                   ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODF
10920                                   ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
10921                                   ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
10922                                   ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
10923                                   ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
10924                                   ;THEN MODFOV WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
10925                                   ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
10926                                   ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
10927                                   ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
10928                                   ;FAILURE MATCHES THE TRUE RESULT THEN  MODFOV PASSES CONTROL TO THE
10929                                   ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
10930                                   ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
10931                                   ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
10932                                   ;IF A MATCH IS MADE HOWEVER, MODFOV WILL RETURN CONTROL TO THE ERROR
10933                                   ;CALL AT ERR2.
10934
10935  054676  012601                   MODFOV: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
10936  054700  012700  000200                   MOV     #200,R0         ;SET FD MODE.
10937  054704  170100                           LDFPS   R0
10938  054706  010100                           MOV     R1,R0           ;SET UP AC0
10939  054710  172410                           LDD     (R0),AC0
10940  054712  012700  052226                   MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
10941  054716  172510                           LDD     (R0),AC1
10942  054720  016100  000030                   MOV     30(R1),R0       ;SET UP THE FPS.
10943  054724  170100                           LDFPS   R0
10944  054726  012737  054742  001236           MOV     #1$,@#$TMP2
10945  054734  010100                           MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
10946  054736  062700  000004                   ADD     #4,R0
10947
10948  054742  171410                   1$:     MODF    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
10949
10950  054744  170204                           STFPS   R4              ;GET THE FPS.
10951  054746  170305                           STST    R5              ;GET FEC.
10952  054750  012700  000200                   MOV     #200,R0         ;SET FD MODE.
10953  054754  170100                           LDFPS   R0
10954  054756  012700  055252                   MOV     #MODFD0,R0      ;GET THE FRACTIONAL RESULT.
10955  054762  174010                           STD     AC0,(R0)
10956  054764  012700  055262                   MOV     #MODFD1,R0      ;GET THE INTEGER RESULT.
10957  054770  174110                           STD     AC1,(R0)
10958
```

```
10959  054772  010102                        MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
10960  054774  010237  001240                MOV     R2,@#$TMP3
10961  055000  062702  000004                ADD     #4,R2
10962  055004  010237  001242                MOV     R2,@#$TMP4
10963  055010  062702  000004                ADD     #4,R2
10964  055014  010237  001244                MOV     R2,@#$TMP5
10965  055020  062702  000004                ADD     #4,R2
10966  055024  010237  001246                MOV     R2,@#$TMP6
10967  055030  012737  055252  001250        MOV     #MODFD0,@#$TMP7
10968  055036  012737  055262  001252        MOV     #MODFD1,@#$TMP10
10969  055044  010437  001254                MOV     R4,@#$TMP11
10970  055050  016137  000032  001256        MOV     32(R1),@#$TMP12
10971  055056  010537  001260                MOV     R5,@#$TMP13
10972  055062  016137  000034  001262        MOV     34(R1),@#$TMP14
10973
10974  055070  012702  055252                MOV     #MODFD0,R2      ;CHECK THE FRACTIONAL RESULT.
10975  055074  026112  000010                CMP     10(R1),(R2)
10976  055100  001025                        BNE     10$             ;BRANCH IF INCORRECT.
10977  055102  026162  000012  000002        CMP     12(R1),2(R2)
10978  055110  001021                        BNE     10$
10979
10980  055112  012702  055262                MOV     #MODFD1,R2      ;CHECK THE INTEGER RESULT.
10981  055116  026112  000014                CMP     14(R1),(R2)
10982  055122  001016                        BNE     15$             ;BRANCH IF INCORRECT.
10983  055124  026162  000016  000002        CMP     16(R1),2(R2)
10984  055132  001012                        BNE     15$
10985
10986  055134  026104  000032                CMP     32(R1),R4       ;CHECK THE FPS.
10987  055140  001024                        BNE     20$             ;BRANCH IF INCORRECT.
10988
10989  055142  026105  000034                CMP     34(R1),R5       ;CHECK THE FEC.
10990  055146  001030                        BNE     25$             ;BRANCH IF INCORRECT.
10991
10992  055150  000161  000044        9$:     JMP     44(R1)          ;RETURN.
10993
10994                                ;FRACTIONAL ERROR.
10995  055154                        10$:                            ;THE ERROR WAS NOT ANTICIPATED SO
10996  055154  104002                12$:    ERROR   2               ;REPORT THE INCORRECT FRACTION HERE.
10997  055156  000774                        BR      9$
10998
10999                                ;INTEGER ERROR.
11000  055160  026112  000024        15$:    CMP     24(R1),(R2)     ;WAS THIS ERROR ANTICIPATED?
11001  055164  001010                        BNE     16$             ;BRANCH IF NOT.
11002  055166  026162  000026  000002        CMP     26(R1),2(R2)
11003  055174  001004                        BNE     16$
11004  055176  010102                        MOV     R1,R2           ;THE ERROR WAS ANTICIAPTED SO RETURN
11005  055200  062702  000042                ADD     #42,R2          ;TO THE ERROR REPORT IN THE CALLING
11006                                                                 ;ROUTINE.
11007  055204  000112                        JMP     (R2)
11008
11009  055206                        16$:                            ;THE ERROR WAS NOT ANTICIPATED SO REPORT
11010  055206  104002                17$:    ERROR   2               ;THE INTEGER FAILURE HERE.
11011  055210  000757                        BR      9$
11012
11013                                ;FPS INCORRECT.
11014  055212  010437  001254        20$:    MOV     R4,@#$TMP11     ;REPORT INCORRECT FPS.
```

```
11015  055216  016137  000032  001256          MOV     32(R1),@#$TMP12
11016  055224  104002                  21$:    ERROR   2
11017  055226  000750                          BR      9$
11018
11019                                  ;REPORT FEC ERROR.
11020  055230  010537  001260          25$:    MOV     R5,@#$TMP13
11021  055234  016137  000034  001262          MOV     34(R1),@#$TMP14
11022  055242  010102                          MOV     R1,R2
11023  055244  062702  000036                  ADD     #36,R2
11024  055250  000112                          JMP     (R2)
11025
11026  055252  000000  000000  000000  MODFD0: .WORD   0,0,0,0
11027  055260  000000
11028
11029  055262  000000  000000  000000  MODFD1: .WORD   0,0,0,0
11030  055270  000000
11031
11032  055272                          MMMDONE:
11033  055272  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
11034                                                                  ;SEE IF THE USER HAS EXPRESSED
11035                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
11036                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
11037                                                                  ;THE USER TYPED CONTROL G?).
11038
11039
11040
11041
11042                                  ;;*****************************************************************
11043                                  ;*TEST 57       UNDER\OVER FLOW, USING MODD WITH TRAPS DISABLED, TEST
11044                                  ;*
11045                                  ;*THIS IS A TEST OF THE MODD INSTRUCTION'S OVER FLOW AND UNDER FLOW
11046                                  ;*CONDITIONS. A SUBROUTINE IS USED TO SET UP THE OPERANDS, EXECUTE THE
11047                                  ;*MODD INSTUCTION AND CHECK THE RESULTS.
11048                                  ;*
11049                                  ;;*****************************************************************
11050  055274  000004                  TST57:  SCOPE
11051
11052                                  ;UNDERFLOW TEST WITH EXPONENT OF THE RESULT = -129, FIU = 1, FID = 1
11053  055276                          NNN1:
11054  055276  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
11055  055300  004737  055712                  JSR     PC,@#MODDOV
11056  055304  020252  125252          1$:     .WORD   20252,125252    ;AC
11057  055310  125252  125252                  .WORD   125252,125252
11058  055314  020100  000000  000000  2$:     .WORD   20100,0,0,0     ;FSRC
11059  055322  000000
11060  055324  000177  177777  177777  3$:     .WORD   177,-1,-1,-1    ;FRACTIONAL RES.
11061  055332  177777
11062  055334  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
11063  055342  000000
11064  055344  020252  125252          5$:     .WORD   20252,125252    ;ERROR FRACTIONAL RES.
11065  055350  125252  125252                  .WORD   125252,125252
11066  055354  000000  000000  177777  6$:     .WORD   0,0,-1,-1       ;ERROR INTEGER RES.
11067  055362  177777
11068  055364  042200                  7$:     42200                   ;FPS BEFORE EXECUTION.
11069  055366  142204                          142204                  ;FPS AFTER EXECUTION.
11070  055370  000012                          12                      ;FEC
```

```
11071  055372  104002                  8$:     ERROR   2               ;FEC INCORRECT ON UNDERFLOW.
11072  055374  000401                          BR      9$
11073  055376  104002                          ERROR   2               ;ST 155 (BUT FD)
11074  055400                          9$:
11075
11076                                  ;UNDERFLOW TEST WITH EXPONENT OF THE RESULT = -193, FIU = 0, FID = 1
11077  055400                          NNN2:
11078  055400  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
11079  055402  004737  055712                  JSR     PC,@#MODDOV
11080  055406  010000  000000          1$:     .WORD   10000,0         ;AC
11081  055412  123456  000000                  .WORD   123456,0
11082  055416  010200  000000  000000  2$:     .WORD   10200,0,0,0     ;FSRC
11083  055424  000000
11084  055426  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
11085  055434  000000
11086  055436  000000  000000  000000  4$:     .WORD   0,0,0,0         ;INTEGER RES.
11087  055444  000000
11088  055446  000000  000000  000000  5$:     .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
11089  055454  000000
11090  055456  000000  000000          6$:     .WORD   0,0             ;ERROR INTEGER RES.
11091  055462  123456  000000                  .WORD   123456,0
11092  055466  005213                  7$:     5213                    ;FPS BEFORE EXECUTION.
11093  055470  005204                          5204                    ;FPS AFTER EXECUTION.
11094  055472  000012                          12
11095  055474  000240                  8$:     NOP
11096  055476  000401                          BR      9$
11097  055500  104002                          ERROR   2               ;ST 047 (BUT FD).
11098  055502                          9$:
11099
11100
11101  055502                          ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, FIV = 1, FID = 1
11102  055502  104414                  NNN3:
11103  055504  004737  055712                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
11104  055510  060252  125252                  JSR     PC,@#MODDOV
11105  055514  125252  125252          1$:     .WORD   60252,125252    ;AC
11106  055520  060100  000000  000000          .WORD   125252,125252
11107  055526  000000                  2$:     .WORD   60100,0,0,0     ;FSRC
11108  055530  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
11109  055536  000000
11110  055540  000177  177777  177777  4$:     .WORD   177,-1,-1,-1    ;INTEGER RES.
11111  055546  177777
11112  055550  000000  000000  000000  5$:     .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
11113  055556  000000
11114  055560  000177  177777          6$:     .WORD   177,-1          ;ERROR INTEGER RES.
11115  055564  125252  125252                  .WORD   125252,125252
11116  055570  041200                  7$:     41200                   ;FPS BEFORE EXECUTION.
11117  055572  141206                          141206                  ;FPS AFTER EXECUTION.
11118  055574  000010                          10                      ;FEC
11119  055576  104002                  8$:     ERROR   2               ;FEC BAD ON OVERFLOW.
11120  055600  000401                          BR      9$
11121  055602  104002                          ERROR   2               ;ST 520 TO 162 INTO 163 (BUT FD).
11122  055604                          9$:
11123
11124
11125  055604                          ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 130, FIV = 0, FID = 1
11126  055604  104414                  NNN4:
                                               LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
```

```
11127  055606  004737  055712                    JSR     PC,@#MODDOV
11128  055612  060200  000000          1$:       .WORD   60200,0         ;AC
11129  055616  125252  000000                    .WORD   125252,0
11130  055622  060200  000000  000000  2$:       .WORD   60200,0,0,0     ;FSRC
11131  055630  000000
11132  055632  000000  000000  000000  3$:       .WORD   0,0,0,0         ;FRACTIONAL RES.
11133  055640  000000
11134  055642  000000  000000  000000  4$:       .WORD   0,0,0,0         ;INTEGER RES.
11135  055650  000000
11136  055652  000000  000000  000000  5$:       .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
11137  055660  000000
11138  055662  000400  000000          6$:       .WORD   400,0           ;ERROR INTEGER RES.
11139  055666  125252  000000                    .WORD   125252,0
11140  055672  006211                  7$:       6211                    ;FPS BEFORE EXECUTION.
11141  055674  006206                            6206                    ;FPS AFTER EXECUTION.
11142  055676  000010                            10                      ;FEC
11143  055700  000240                  8$:       NOP
11144  055702  000401                            BR      9$
11145  055704  104002                            ERROR   2               ;ST 520 TO 162 INTO STORE ZERO TWICE.
11146  055706  000137  056320          9$:       JMP     @#NNNDONE       ;GO TO NEXT TEST.
11147
11148                                  ;THIS SUBROUTINE, MODDOV, IS CALLED TO SETUP THE
11149                                  ;OPERANDS, EXECUTE THE MODD INSTRUCTION AND CHECK THE RESULTS.
11150                                  ;IT IS CALLED THUS:
11151                                  ;
11152                                  ;               ACARG:   .WORD   X,X,X,X        ;AC OPERAND
11153                                  ;               FSRCARG:.WORD    X,X,X,X        ;FSRC OPERAND
11154                                  ;               FRES:    .WORD   X,X,X,X        ;FRACTIONAL RESULT
11155                                  ;               INTRES:  .WORD   X,X,X,X        ;INTEGER RESULT
11156                                  ;               ERFRES:  .WORD   X,X,X,X        ;ERROR FRACTION RESULT
11157                                  ;               ERINTRES:.WORD   X,X,X,X        ;ERROR INTEGER RESULT
11158                                  ;               FPSB:    .WORD   X              ;FPS BEFORE EXECUTION
11159                                  ;               FPSA:    .WORD   X              ;FPS AFTER EXECUTION
11160                                  ;               ERR1:    ERROR   X              ;FRACTION ERROR
11161                                  ;                        BR      CONT
11162                                  ;               ERR2:    ERROR   X              ;INTEGER ERROR
11163                                  ;               CONT:                           ;RETURN ADDRESS
11164                                  ;
11165                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODD
11166                                  ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
11167                                  ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
11168                                  ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
11169                                  ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
11170                                  ;THEN MODDOV WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
11171                                  ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
11172                                  ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
11173                                  ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
11174                                  ;FAILURE MATCHES THE TRUE RESULT THEN  MODDOV PASSES CONTROL TO THE
11175                                  ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
11176                                  ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
11177                                  ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
11178                                  ;IF A MATCH IS MADE HOWEVER, MODDOV WILL RETURN CONTROL TO THE ERROR
11179                                  ;CALL AT ERR2.
11180
11181  055712  012601                  MODDOV: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
11182  055714  012700  000200                  MOV     #200,R0         ;SET FD MODE.
```

```
11183  055720  170100                          LDFPS   R0
11184  055722  010100                          MOV     R1,R0           ;SET UP AC0
11185  055724  172410                          LDD     (R0),AC0
11186  055726  012700  052226                  MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
11187  055732  172510                          LDD     (R0),AC1
11188  055734  016100  000060                  MOV     60(R1),R0       ;SET UP THE FPS.
11189  055740  170100                          LDFPS   R0
11190  055742  012737  055756  001236          MOV     #1$,@#$TMP2
11191  055750  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
11192  055752  062700  000010                  ADD     #10,R0
11193
11194  055756  171410                  1$:     MODD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
11195
11196  055760  170305                          STST    R5              ;GET THE FPS.
11197  055762  170204                          STFPS   R4              ;GET THE FPS.
11198  055764  012700  000200                  MOV     #200,R0         ;SET FD MODE.
11199  055770  170100                          LDFPS   R0
11200  055772  012700  056300                  MOV     #MODDD0,R0      ;GET THE FRACTIONAL RESULT.
11201  055776  174010                          STD     AC0,(R0)
11202  056000  012700  056310                  MOV     #MODDD1,R0      ;GET THE INTEGER RESULT.
11203  056004  174110                          STD     AC1,(R0)
11204
11205  056006  010102                          MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
11206  056010  010237  001240                  MOV     R2,@#$TMP3
11207  056014  062702  000010                  ADD     #10,R2
11208  056020  010237  001242                  MOV     R2,@#$TMP4
11209  056024  062702  000010                  ADD     #10,R2
11210  056030  010237  001244                  MOV     R2,@#$TMP5
11211  056034  062702  000010                  ADD     #10,R2
11212  056040  010237  001246                  MOV     R2,@#$TMP6
11213  056044  012737  056300  001250          MOV     #MODDD0,@#$TMP7
11214  056052  012737  056310  001252          MOV     #MODDD1,@#$TMP10
11215  056060  010437  001254                  MOV     R4,@#$TMP11
11216  056064  016137  000062  001256          MOV     62(R1),@#$TMP12
11217  056072  010537  001260                  MOV     R5,@#$TMP13
11218  056076  016137  000064  001262          MOV     64(R1),@#$TMP14
11219
11220  056104  012702  056300                  MOV     #MODDD0,R2      ;CHECK THE FRACTIONAL RESULT.
11221  056110  010103                          MOV     R1,R3
11222  056112  062703  000020                  ADD     #20,R3
11223  056116  012700  000004                  MOV     #4,R0
11224  056122  022223                  2$:     CMP     (R2)+,(R3)+
11225  056124  001023                          BNE     10$             ;BRANCH IF INCORRECT.
11226  056126  077003                          SOB     R0,2$
11227
11228  056130  012702  056310                  MOV     #MODDD1,R2      ;CHECK THE INTEGER RESULT.
11229  056134  010103                          MOV     R1,R3
11230  056136  062703  000030                  ADD     #30,R3
11231  056142  012700  000004                  MOV     #4,R0
11232  056146  022223                  3$:     CMP     (R2)+,(R3)+
11233  056150  001013                          BNE     15$             ;BRANCH IF INCORRECT.
11234  056152  077003                          SOB     R0,3$
11235
11236
11237  056154  026104  000062                  CMP     62(R1),R4       ;CHECK THE FPS.
11238  056160  001027                          BNE     20$             ;BRANCH IF INCORRECT.
```

```
11239
11240  056162  026105  000064                  CMP     64(R1),R5       ;CHECK THE FEC.
11241  056166  001033                          BNE     25$
11242
11243  056170  000161  000074          9$:     JMP     74(R1)          ;RETURN.
11244
11245                                  ;FRACTIONAL ERROR.
11246  056174                          10$:                            ;THE ERROR WAS NOT ANTICIPATED SO
11247  056174  104002                  12$:    ERROR   2               ;REPORT THE INCORRECT FRACTION HERE.
11248  056176  000774                          BR      9$
11249
11250                                  ;INTEGER ERROR.
11251  056200  012702  056310          15$:    MOV     #MODDD1,R2      ;WAS THE INTEGER ERROR ANTICIPATED?
11252  056204  010103                          MOV     R1,R3
11253  056206  062703  000050                  ADD     #50,R3
11254  056212  012705  000004                  MOV     #4,R5
11255  056216  022223                  60$:    CMP     (R2)+,(R3)+
11256  056220  001005                          BNE     17$             ;BRANCH IF NOT ANTICIPATED.
11257  056222  077503                          SOB     R5,60$
11258  056224  010102                          MOV     R1,R2           ;THE ERROR WAS ANTICIAPTED SO RETURN
11259  056226  062702  000072                  ADD     #72,R2          ;TO THE ERROR REPORT IN THE CALLING
11260                                                                  ;ROUTINE.
11261  056232  000112                          JMP     (R2)
11262
11263  056234                          16$:                            ;THE ERROR WAS NOT ANTICIPATED SO REPORT
11264  056234  104002                  17$:    ERROR   2               ;THE INTEGER FAILURE HERE.
11265  056236  000754                          BR      9$
11266
11267                                  ;FPS INCORRECT.
11268  056240  010437  001254          20$:    MOV     R4,@#$TMP11     ;REPORT INCORRECT FPS.
11269  056244  016137  000062  001256          MOV     62(R1),@#$TMP12
11270  056252  104002                  21$:    ERROR   2
11271  056254  000745                          BR      9$
11272
11273                                  ;REPORT FEC ERROR.
11274  056256  010537  001260          25$:    MOV     R5,@#$TMP13
11275  056262  016137  000064  001262          MOV     64(R1),@#$TMP14
11276  056270  010102                          MOV     R1,R2
11277  056272  062702  000066                  ADD     #66,R2
11278  056276  000112                          JMP     (R2)
11279
11280  056300  000000  000000  000000  MODDD0: .WORD   0,0,0,0
11281  056306  000000
11282
11283  056310  000000  000000  000000  MODDD1: .WORD   0,0,0,0
11284  056316  000000
11285
11286  056320                          NNNDONE:
11287  056320  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
11288                                                                  ;SEE IF THE USER HAS EXPRESSED
11289                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
11290                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
11291                                                                  ;THE USER TYPED CONTROL G?).
11292
11293
11294                                  ;;*****************************************************************
```

```
11295                                   ;*TEST 60       MORE MICROCODES COVERAGE
11296                                   ;*THIS TEST WILL PROVIDE ADDITIONAL MICRO-CODE LOCATIONS COVERAGE
11297                                   ;*IN FPP1 AND FPP2.
11298                                   ;*
11299                                   ;;*****************************************************************
11300  056322  000004                  TST60:  SCOPE
11301  056324                          XX1:
11302  056324  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
11303  056326  012737  056342  000244  XT1:    MOV     #XT1A,@#244
11304  056334  170227  000000                  STFPS   #0
11305  056340  000401                          BR      XT2
11306  056342  104001                  XT1A:   ERROR   1               ;SHOULD NOT TRAP
11307
11308  056344  012700  177777          XT2:    MOV     #-1,R0
11309  056350  170127  000000                  LDFPS   #0
11310  056354  170200                          STFPS   R0
11311  056356  005700                          TST     R0
11312  056360  001401                          BEQ     XT2A
11313  056362  104001                          ERROR   1               ;FPS IS NOT ZEROED
11314  056364  012700  057124          XT2A:   MOV     #XPAT0,R0
11315  056370  172440                          LDF     -(R0),AC0
11316  056372  022700  057120                  CMP     #XPAT0-4,R0
11317  056376  001401                          BEQ     XT2B
11318  056400  104001                          ERROR   1               ;R0 WAS NOT DECR BY 4
11319  056402  170200                  XT2B:   STFPS   R0
11320  056404  022700  000004                  CMP     #4,R0           ;CHECK IF FZ IS SET?
11321  056410  001401                          BEQ     XT3
11322  056412  104001                          ERROR   1
11323
11324  056414  170127  000000          XT3:    LDFPS   #0
11325  056420  012700  057124                  MOV     #XPAT0,R0
11326  056424  174040                          STF     AC0,-(R0)
11327  056426  022700  057120                  CMP     #XPAT0-4,R0
11328  056432  001401                          BEQ     XT3A            ;R0 WAS NOT DECR BY 4
11329  056434  104001                          ERROR   1
11330  056436  170200                  XT3A:   STFPS   R0
11331  056440  005700                          TST     R0
11332  056442  001401                          BEQ     XT4
11333  056444  104001                          ERROR   1
11334
11335  056446  170127  000000          XT4:    LDFPS   #0
11336  056452  012737  056476  000244          MOV     #XT4A,@#244
11337  056460  170127  004000                  LDFPS   #04000          ;INTRPT ON UNDEFINED VARIABLE
11338  056464  172437  057124                  LDF     @#XPAT0,AC0
11339  056470  174437  057154                  DIVF    @#XPAT3,AC0     ;GET UNDEFINED VARIABLE, _0
11340  056474  104001                          ERROR   1               ;MISSING INTERRUPT TO 244-
11341  056476  170200                  XT4A:   STFPS   R0
11342  056500  022700  104004                  CMP     #104004,R0      ;CHECK: FER,FIUV,FZ ARE SET?
11343  056504  001401                          BEQ     XT4B
11344  056506  104001                          ERROR   1
11345  056510  012700  057114          XT4B:   MOV     #XBUF,R0
11346  056514  174010                          STF     AC0,(R0)
11347  056516  005737  057114                  TST     @#XBUF
11348  056522  001401                          BEQ     XT5
11349  056524  104001                          ERROR   1               ;AC0 SHOULD REMAIN ZEROED
11350
```

```
11351  056526  012737  056546  000244  XT5:    MOV     #XT5A,@#244
11352  056534  170127  004000                  LDFPS   #04000          ;INTRPT ON UNDEFINED VARIBALE
11353  056540  177437  057154                  LDCDF   @#XPAT3,AC0     ;GET UNDEFINED VARIABLE, _0
11354  056544  104001                          ERROR   1               ;MISSING INTERRUPT TO 244
11355  056546  170200                  XT5A:   STFPS   R0
11356  056550  022700  104014                  CMP     #104014,R0      ;CHECK: FER,FIUV,FN,FZ ARE SET?
11357  056554  001401                          BEQ     XT5B
11358  056556  104001                          ERROR   1
11359  056560  012700  057114          XT5B:   MOV     #XBUF,R0
11360  056564  174010                          STF     AC0,(R0)
11361  056566  005737  057114                  TST     @#XBUF
11362  056572  001401                          BEQ     XT6
11363  056574  104001                          ERROR   1               ;AC0 SHOULD BE ZEROED
11364
11365  056576                          XT6:
11366  056576  104414                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
11367  056600  012737  056624  000244          MOV     #XT6A,@#244
11368  056606  170127  004000                  LDFPS   #04000          ;INTRPT ON UNDEFINED VARIBALE
11369  056612  172437  057124                  LDF     @#XPAT0,AC0
11370  056616  172037  057154                  ADDF    @#XPAT3,AC0
11371  056622  104002                          ERROR   2               ;MISSING INTERRUPT TO 244
11372  056624  170200                  XT6A:   STFPS   R0
11373  056626  022700  104004                  CMP     #104004,R0      ;CHECK: FER,FIUV,FZ ARE SET?
11374  056632  001401                          BEQ     XT6B
11375  056634  104002                          ERROR   2
11376  056636  012700  057114          XT6B:   MOV     #XBUF,R0
11377  056642  174010                          STF     AC0,(R0)
11378  056644  005737  057114                  TST     @#XBUF
11379  056650  001401                          BEQ     XT7
11380  056652  104002                          ERROR   2               ;AC0 SHOULD BE ZEROED
11381
11382  056654  170127  000000          XT7:    LDFPS   #0
11383  056660  172437  057164                  LDF     @#XPAT4,AC0
11384  056664  175437  057214                  STCFI   AC0,@#XPAT0
11385  056670  022737  000002  057214          CMP     #2,@#XPAT0      ;CHECK DATA
11386  056676  001401                          BEQ     XT8
11387  056700  104001                          ERROR   1
11388
11389  056702  170127  000100          XT8:    LDFPS   #100            ;SET FL
11390  056706  172437  057164                  LDF     @#XPAT4,AC0
11391  056712  175467  000276                  STCFI   AC0,XPAT0
11392  056716  022737  000002  057216          CMP     #2,@#XPAT0+2
11393  056724  001401                          BEQ     XT9
11394  056726  104001                          ERROR   1
11395
11396                                  ;START OF FPP2
11397  056730  170127  000000          XT9:    LDFPS   #0
11398  056734  172437  057124                  LDF     @#XPAT0,AC0
11399  056740  172037  057164                  ADDF    @#XPAT4,AC0
11400  056744  170200                          STFPS   R0
11401  056746  005700                          TST     R0
11402  056750  001401                          BEQ     XT10
11403  056752  104002                          ERROR   2
11404
11405  056754  170127  000000          XT10:   LDFPS   #0
11406  056760  172437  057164                  LDF     @#XPAT4,AC0
```

```
11407  056764  173037  057164          SUBF    @#XPAT4,AC0
11408  056770  170200                  STFPS   R0
11409  056772  022700  000004          CMP     #4,R0
11410  056776  001401                  BEQ     XT11
11411  057000  104002                  ERROR   2
11412
11413  057002  170127  000000  XT11:   LDFPS   #0
11414  057006  172437  057164          LDF     @#XPAT4,AC0
11415  057012  173437  057164          CMPF    @#XPAT4,AC0
11416  057016  170200                  STFPS   R0
11417  057020  022700  000004          CMP     #4,R0           ;CHECK IF FZ IS SET?
11418  057024  001401                  BEQ     XT12
11419  057026  104002                  ERROR   2
11420
11421  057030  170127  000000  XT12:   LDFPS   #0
11422  057034  172437  057164          LDF     @#XPAT4,AC0
11423  057040  174437  057144          DIVF    @#XPAT2,AC0
11424  057044  012700  057114          MOV     #XBUF,R0
11425  057050  174010                  STF     AC0,(R0)
11426  057052  022737  040176  057114  CMP     #040176,@#XBUF  ;CHECK DATA
11427  057060  001401                  BEQ     XT13
11428  057062  104002                  ERROR   2
11429
11430  057064  170127  000000  XT13:   LDFPS   #0
11431  057070  172437  057174          LDF     @#XPAT5,AC0
11432  057074  174437  057204          DIVF    @#XPAT6,AC0
11433  057100  170200                  STFPS   R0
11434  057102  022700  000004          CMP     #4,R0
11435  057106  001401                  BEQ     XT13B
11436  057110  104002                  ERROR   2
11437  057112  000444          XT13B:  BR      XNEXT
11438
11439
11440  057114  000000  000000  000000  XBUF:   .WORD   0,0,0,0
11441  057122  000000
11442  057124  000000  000000  000000  XPAT0:  .WORD   0,0,0,0
11443  057132  000000
11444  057134  000001  000001  000001  XPAT1:  .WORD   1,1,1,1
11445  057142  000001
11446  057144  040401  000000  000000  XPAT2:  .WORD   40401,0,0,0
11447  057152  000000
11448  057154  100000  000000  000000  XPAT3:  .WORD   100000,0,0,0
11449  057162  000000
11450  057164  040400  000000  000000  XPAT4:  .WORD   040400,0,0,0
11451  057172  000000
11452  057174  000207  000000  000000  XPAT5:  .WORD   207,0,0,0
11453  057202  000000
11454  057204  077007  000000  000000  XPAT6:  .WORD   77007,0,0,0
11455  057212  000000
11456  057214  000000  000000  000000  XPAT0:  .WORD   0,0,0,0
11457  057222  000000
11458
11459  057224          XNEXT:
11460
11461  057224  012706  001100          MOV     #STACK,SP       ;SET UP STACK POINTER
11462  057230  012737  057264  000004  MOV     #1$,@#4         ;SET UP FOR TIMEOUT IF NO MULTI-TESTER
```

```
11463  057236  012737  000340  000006          MOV     #340,@#6
11464  057244  012737  000001  164000          MOV     #1,@#164000     ;SET ''STOP'' ON MULTI-TESTER
11465  057252  012737  000006  000004          MOV     #6,@#4          ;RESTORE TRAP CATCHER
11466  057260  005037  000006                  CLR     @#6
11467  057264                          1$:
11468
11469
11470  057264                          TST61:
11471
11472
11473
11474                                   .SBTTL  END OF PASS ROUTINE
11475
11476                                   ;;*******************************************************************
11477                                   ;*INCREMENT THE PASS NUMBER ($PASS)
11478                                   ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
11479                                   ;*TYPE 'END PASS #XXXXX'' (WHERE XXXXX IS A DECIMAL NUMBER)
11480                                   ;*IF SW12=1 INHIBIT TRACE TRAP
11481                                   ;*IF THERES A MONITOR GO TO IT
11482                                   ;*IF THERE ISN'T JUMP TO LOOP
11483
11484  057264                          $EOP:
11485  057264  000004                          SCOPE
11486  057266  005067  121610                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
11487  057272  005067  122004                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
11488  057276  005267  122022                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
11489  057302  042767  100000  122014          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
11490  057310  005327                          DEC     (PC)+           ;;LOOP?
11491  057312  000001                  $EOPCT: .WORD   1
11492  057314  003031                          BGT     $DOAGN          ;;YES
11493  057316  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
11494  057320  000001                  $ENDCT: .WORD   1
11495  057322  057312                          $EOPCT
11496  057324  104401  057447                  TYPE    ,$ENDMG         ;;TYPE 'END PASS #''
11497  057330  016746  121770                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
11498  057334  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
11499  057336  104401  057444                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
11500  057342  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
11501  057346  001414                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
11502  057350  005046                          CLR     -(SP)           ;;INSURE THE ''T'' BIT IS CLEAR
11503  057352  012746  057360                  MOV     #$CLR.T,-(SP)   ;;SETUP FOR AN RTI OR RTT
11504  057356  000426                          BR      $RTRN           ;;GO DO AN RTI OR RTT TO LOAD THE PSW
11505                                                                  ;;WITH A CLEARED ''T'' BIT
11506  057360                          $CLR.T:
11507  057360  013700  000042                  MOV     @#42,R0         ;;INSURE R0 CONTAINS THE MONITORS
11508  057364  001405                          BEQ     $DOAGN          ;;RETURN ADDRESS
11509  057366  000005                          RESET                   ;;CLEAR THE WORLD
11510  057370  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
11511  057372  000240                          NOP                     ;;SAVE ROOM
11512  057374  000240                          NOP                     ;;FOR
11513  057376  000240                          NOP                     ;;ACT11
11514  057400                          $DOAGN:
11515  057400  104400                          TRAP                    ;;PUSH OLD PSW AND PC ON STACK
11516  057402  042716  000020                  BIC     #20,(SP)        ;;CLEAR THE ''T'' BIT
11517  057406  032777  010000  121524          BIT     #BIT12,@SWR     ;;RUN WITH TRACE TRAP?
11518  057414  001005                          BNE     1$              ;;BR IF NO
```

```
11519  057416  005167  000020                  COM     $TBIT           ;;IS IT TIME FOR TRACE TRAP
11520  057422  100402                          BMI     1$              ;;BR IF NO
11521  057424  052716  000020                  BIS     #20,(SP)        ;;SET TRACE TRAP
11522  057430  012746  057436          1$:     MOV     #$LOOP,-(SP)    ;;JUMP TO START OF TEST
11523  057434  000002                  $RTRN:  RTI                     ;;RETURN--THIS IS CHANGED TO
11524                                                                  ;;AN 'RTT' IF 'RTT' IS A LEGAL
11525                                                                  ;;INSTRUCTION
11526  057436                          $LOOP:
11527  057436  000137                          JMP     @(PC)+          ;;RETURN
11528  057440  002160                  $RTNAD: .WORD   LOOP
11529  057442  000000                  $TBIT:  .WORD   0               ;;'T' BIT STATE INDICATOR
11530  057444     377     377     000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
11531  057447     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
11532  057454  050040  051501  020123
11533  057462  000043
11534
11535                                  .SBTTL  SCOPE HANDLER ROUTINE
11536
11537                                  ;;**************************************************************************
11538                                  ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
11539                                  ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
11540                                  ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
11541                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
11542                                  ;*SW14=1        LOOP ON TEST
11543                                  ;*SW11=1        INHIBIT ITERATIONS
11544                                  ;*SW09=1        LOOP ON ERROR
11545                                  ;*SW08=1        LOOP ON TEST IN SWR<7:0>
11546                                  ;*CALL
11547                                  ;*      SCOPE           ;;SCOPE=IOT
11548
11549  057464                          $SCOPE:
11550  057464  104407                          CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
11551  057466  032777  040000  121444  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
11552  057474  001114                          BNE     $OVER           ;;YES IF SW14=1
11553                                  ;#####START OF CODE FOR THE XOR TESTER#####
11554  057476  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE 'XOR' TESTER CHANGE
11555                                                                  ;;THIS INSTRUCTION TO A 'NOP' (NOP=240)
11556  057500  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
11557  057504  012737  057524  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
11558  057512  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
11559  057516  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
11560  057522  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
11561  057524  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
11562  057526  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
11563  057532  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
11564  057534                          6$:;#####END OF CODE FOR THE XOR TESTER#####
11565  057534  032777  000400  121376          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
11566  057542  001404                          BEQ     2$              ;;BR IF NO
11567  057544  127767  121370  121330          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
11568  057552  001465                          BEQ     $OVER           ;;BR IF YES
11569  057554  105767  121323          2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
11570  057560  001421                          BEQ     3$              ;;BR IF NO
11571  057562  126767  121327  121313          CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
11572  057570  101015                          BHI     3$              ;;BR IF NO
11573  057572  032777  001000  121340          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
11574  057600  001404                          BEQ     4$              ;;BR IF NO
```

```
11575  057602  016767  121302  121276  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
11576  057610  000446                  BR      $OVER
11577  057612  105067  121265          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
11578  057616  005067  121460                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
11579  057622  000415                  BR      1$                      ;;ESCAPE TO THE NEXT TEST
11580  057624  032777  004000  121306  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
11581  057632  001011                  BNE     1$                      ;;BR IF YES
11582  057634  005767  121464                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
11583  057640  001406                  BEQ     1$                      ;;      INHIBIT ITERATIONS
11584  057642  005267  121236                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
11585  057646  026767  121430  121230          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
11586  057654  002024                  BGE     $OVER                   ;;BR IF MORE ITERATION REQUIRED
11587  057656  012767  000001  121220  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
11588  057664  016767  000052  121410          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
11589  057672  105267  121204          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
11590  057676  116767  121200  121416          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
11591  057704  011667  121176                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
11592  057710  011667  121174                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
11593  057714  005067  121364                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
11594  057720  112767  000001  121167          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
11595  057726  016777  121150  121206  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
11596  057734  016716  121146          .       MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
11597  057740  000002                  RTI                             ;;FIXES PS
11598  057742  000001          $MXCNT: 1                               ;;MAX. NUMBER OF ITERATIONS
11599
11600                                  .SBTTL  ERROR HANDLER ROUTINE
11601
11602                                  ;;**************************************************************************
11603                                  ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
11604                                  ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
11605                                  ;*AND GO TO ERTYPE ON ERROR
11606                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
11607                                  ;*SW15=1         HALT ON ERROR
11608                                  ;*SW13=1         INHIBIT ERROR TYPEOUTS
11609                                  ;*SW10=1         BELL ON ERROR
11610                                  ;*SW09=1         LOOP ON ERROR
11611                                  ;*CALL
11612                                  ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
11613
11614  057744                  $ERROR:
11615  057744  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
11616  057746  105267  121131          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
11617  057752  001775                  BEQ     7$                      ;;DON'T LET THE FLAG GO TO ZERO
11618  057754  016777  121122  121160          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
11619  057762  032777  002000  121150          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
11620  057770  001402                  BEQ     1$                      ;;NO - SKIP
11621  057772  104401  001306                  TYPE    ,$BELL          ;;RING BELL
11622  057776  005267  121110          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
11623  060002  011667  121110                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
11624  060006  162767  000002  121102          SUB     #2,$ERRPC
11625  060014  117767  121076  121072          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
11626  060022  032777  020000  121110          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
11627  060030  001004                  BNE     20$                     ;;SKIP TYPEOUTS
11628  060032  004767  002314                  JSR     PC,ERTYPE       ;;GO TO USER ERROR ROUTINE
11629  060036  104401  001313                  TYPE    ,$CRLF
11630  060042                  20$:
```

```
11631  060042  122767  000001  121266          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
11632  060050  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
11633  060052  116767  121036  000004          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
11634  060060  004767  001126                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
11635  060064     000                  21$:    .BYTE   0
11636  060065     000                          .BYTE   0
11637  060066  000777                  22$:    BR      22$             ;;APT ERROR LOOP
11638  060070  005777  121044          2$:     TST     @SWR            ;;HALT ON ERROR
11639  060074  100002                          BPL     3$              ;;SKIP IF CONTINUE
11640  060076  000000                          HALT                    ;;HALT ON ERROR!
11641  060100  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
11642  060102  032777  001000  121030  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
11643  060110  001402                          BEQ     4$              ;;BR IF NO
11644  060112  016716  120772                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
11645  060116  005767  121162          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
11646  060122  001402                          BEQ     5$              ;;BR IF NONE
11647  060124  016716  121154                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
11648  060130                          5$:
11649  060130  022737  057370  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
11650  060136  001001                          BNE     6$              ;;BRANCH IF NO
11651  060140  000000                          HALT                    ;;YES
11652  060142                          6$:
11653  060142  000002                          RTI                     ;;RETURN
11654
11655                                  .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
11656
11657                                  ;;**********************************************************************
11658                                  ;*SAVE R0-R5
11659                                  ;*CALL:
11660                                  ;*      SAVREG
11661                                  ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
11662                                  ;*
11663                                  ;*TOP---(+16)
11664                                  ;* +2---(+18)
11665                                  ;* +4---R5
11666                                  ;* +6---R4
11667                                  ;* +8---R3
11668                                  ;*+10---R2
11669                                  ;*+12---R1
11670                                  ;*+14---R0
11671
11672  060144                          $SAVREG:
11673  060144  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11674  060146  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
11675  060150  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
11676  060152  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
11677  060154  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
11678  060156  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
11679  060160  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
11680  060164  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
11681  060170  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
11682  060174  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
11683  060200  000002                          RTI
11684
11685                                  ;*RESTORE R0-R5
11686                                  ;*CALL:
```

SAVE AND RESTORE R0-R5 ROUTINES

SEQ 0212

```
11687                                   ;*      RESREG
11688   060202                          $RESREG:
11689   060202  012666  000022                MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
11690   060206  012666  000022                MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
11691   060212  012666  000022                MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
11692   060216  012666  000022                MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
11693   060222  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
11694   060224  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
11695   060226  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
11696   060230  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
11697   060232  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
11698   060234  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
11699   060236  000002                        RTI
11700
11701                                   .SBTTL  TYPE ROUTINE
11702
11703                                   ;;*****************************************************************
11704                                   ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
11705                                   ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
11706                                   ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
11707                                   ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
11708                                   ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
11709                                   ;*
11710                                   ;*CALL:
11711                                   ;*1) USING A TRAP INSTRUCTION
11712                                   ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
11713                                   ;*OR
11714                                   ;*      TYPE
11715                                   ;*      MESADR
11716                                   ;*
11717
11718   060240  105767  120713          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
11719   060244  100002                          BPL     1$              ;;BR IF YES
11720   060246  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
11721   060250  000430                          BR      3$              ;;LEAVE
11722   060252  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
11723   060254  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
11724   060260  122767  000001  121050          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
11725   060266  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
11726   060270  132767  000100  121041          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
11727   060276  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
11728   060300  010067  000004                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
11729   060304  004767  000672                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
11730   060310  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
11731   060312  132767  000040  121017  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
11732   060320  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
11733   060322  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
11734   060324  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
11735   060326  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
11736   060330  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
11737   060332  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
11738   060336  000002                          RTI                     ;;RETURN
11739   060340  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
11740   060344  001430                          BEQ     8$
11741   060346  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
11742   060352  001006                          BNE     5$
```

```
11743  060354  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
11744  060356  104401                          TYPE                    ;;TYPE A CR AND LF
11745  060360  001313                          $CRLF
11746  060362  105067  000130                 CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
11747  060366  000755                          BR      2$              ;;GET NEXT CHARACTER
11748  060370  004767  000056          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
11749  060374  126726  120556          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
11750  060400  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
11751  060402  016746  120546                 MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
11752                                                                  ;;AND THE NULL CHAR.
11753  060406  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
11754  060412  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
11755  060414  004767  000032                 JSR     PC,$TYPEC       ;;GO TYPE A NULL
11756  060420  105367  000072                 DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
11757  060424  000770                          BR      7$              ;;LOOP
11758
11759                                  ;HORIZONTAL TAB PROCESSOR
11760
11761  060426  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
11762  060432  004767  000014          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
11763  060436  132767  000007  000052          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
11764  060444  001372                          BNE     9$              ;;TAB STOP
11765  060446  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
11766  060450  000724                          BR      2$              ;;GET NEXT CHARACTER
11767  060452  105777  120472          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
11768  060456  100375                          BPL     $TYPEC
11769  060460  116677  000002  120464         MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
11770  060466  122766  000015  000002         CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
11771  060474  001003                          BNE     1$              ;;BRANCH IF NO
11772  060476  105067  000014                 CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
11773  060502  000406                          BR      $TYPEX          ;;EXIT
11774  060504  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
11775  060512  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
11776  060514  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
11777  060516  000000                  $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
11778  060520  000207                  $TYPEX: RTS     PC
11779
11780
11781                                  .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
11782
11783                                  ;;**********************************************************************
11784                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
11785                                  ;*OCTAL (ASCII) NUMBER AND TYPE IT.
11786                                  ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
11787                                  ;*CALL:
11788                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
11789                                  ;*      TYPOS                   ;;CALL FOR TYPEOUT
11790                                  ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
11791                                  ;*      .BYTE   M               ;;M=1 OR 0
11792                                  ;*                                      ;;1=TYPE LEADING ZEROS
11793                                  ;*                                      ;;0=SUPPRESS LEADING ZEROS
11794                                  ;*
11795                                  ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
11796                                  ;*$TYPOS OR $TYPOC
11797                                  ;*CALL:
11798                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
```

```
11799                                   ;*      TYPON                   ;;CALL FOR TYPEOUT
11800                                   ;*
11801                                   ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
11802                                   ;*CALL:
11803                                   ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
11804                                   ;*      TYPOC                   ;;CALL FOR TYPEOUT
11805
11806  060522  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
11807  060526  116667  000001  000211          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
11808  060534  112667  000207                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TC TYPE
11809  060540  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
11810  060544  000406                          BR      $TYPON
11811  060546  112767  000001  000171  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
11812  060554  112767  000006  000165          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
11813  060562  112767  000005  000154  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
11814  060570  010346                          MOV     R3,-(SP)        ;;SAVE R3
11815  060572  010446                          MOV     R4,-(SP)        ;;SAVE R4
11816  060574  010546                          MOV     R5,-(SP)        ;;SAVE R5
11817  060576  116704  000145                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
11818  060602  005404                          NEG     R4
11819  060604  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
11820  060610  110467  000132                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
11821  060614  116704  000125                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
11822  060620  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
11823  060624  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
11824  060626  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
11825  060630  000404                          BR      3$              ;;GO DO MSB
11826  060632  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
11827  060634  006105                          ROL     R5
11828  060636  006105                          ROL     R5
11829  060640  010503                          MOV     R5,R3
11830  060642  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
11831  060644  105367  000076                  DECB    $OMODE          ;;TYPE THIS DIGIT?
11832  060650  100016                          BPL     7$              ;;BR IF NO
11833  060652  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
11834  060656  001002                          BNE     4$              ;;TEST FOR 0
11835  060660  005704                          TST     R4              ;;SUPPRESS THIS 0?
11836  060662  001403                          BEQ     5$              ;;BR IF YES
11837  060664  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
11838  060666  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
11839  060672  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
11840  060676  110367  000040                  MOVB    R3,8$           ;;SAVE FOR TYPING
11841  060702  104401  060742                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
11842  060706  105367  000032          7$:     DECB    $OCNT           ;;COUNT BY 1
11843  060712  003347                          BGT     2$              ;;BR IF MORE TO DO
11844  060714  002402                          BLT     6$              ;;BR IF DONE
11845  060716  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
11846  060720  000744                          BR      2$              ;;GO DO THE LAST DIGIT
11847  060722  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
11848  060724  012604                          MOV     (SP)+,R4        ;;RESTORE R4
11849  060726  012603                          MOV     (SP)+,R3        ;;RESTORE R3
11850  060730  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
11851  060736  012616                          MOV     (SP)+,(SP)
11852  060740  000002                          RTI                     ;;RETURN
11853  060742     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
11854  060743     000                          .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
```

```
11855  060744  000                     $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
11856  060745  000                     $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
11857  060746  000000                  $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
11858
11859                                  .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
11860
11861                                  ;;**********************************************************************
11862                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
11863                                  ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
11864                                  ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
11865                                  ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
11866                                  ;*REPLACED WITH SPACES.
11867                                  ;*CALL:
11868                                  ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
11869                                  ;*      TYPDS                   ;;GO TO THE ROUTINE
11870
11871  060750                          $TYPDS:
11872  060750  010046                         MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11873  060752  010146                         MOV     R1,-(SP)        ;;PUSH R1 ON STACK
11874  060754  010246                         MOV     R2,-(SP)        ;;PUSH R2 ON STACK
11875  060756  010346                         MOV     R3,-(SP)        ;;PUSH R3 ON STACK
11876  060760  010546                         MOV     R5,-(SP)        ;;PUSH R5 ON STACK
11877  060762  012746  020200                 MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
11878  060766  016605  000020                 MOV     20(SP),R5       ;;GET THE INPUT NUMBER
11879  060772  100004                         BPL     1$              ;;BR IF INPUT IS POS.
11880  060774  005405                         NEG     R5              ;;MAKE THE BINARY NUMBER POS.
11881  060776  112766  000055  000001         MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
11882  061004  005000                  1$:    CLR     R0              ;;ZERO THE CONSTANTS INDEX
11883  061006  012703  061164                 MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
11884  061012  112723  000040                 MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
11885  061016  005002                  2$:    CLR     R2              ;;CLEAR THE BCD NUMBER
11886  061020  016001  061154                 MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
11887  061024  160105                  3$:    SUB     R1,R5           ;;FORM THIS BCD DIGIT
11888  061026  002402                         BLT     4$              ;;BR IF DONE
11889  061030  005202                         INC     R2              ;;INCREASE THE BCD DIGIT BY 1
11890  061032  000774                         BR      3$
11891  061034  060105                  4$:    ADD     R1,R5           ;;ADD BACK THE CONSTANT
11892  061036  005702                         TST     R2              ;;CHECK IF BCD DIGIT=0
11893  061040  001002                         BNE     5$              ;;FALL THROUGH IF 0
11894  061042  105716                         TSTB    (SP)            ;;STILL DOING LEADING 0'S?
11895  061044  100407                         BMI     7$              ;;BR IF YES
11896  061046  106316                  5$:    ASLB    (SP)            ;;MSD?
11897  061050  103003                         BCC     6$              ;;BR IF NO
11898  061052  116663  000001  177777         MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
11899  061060  052702  000060          6$:    BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
11900  061064  052702  000040          7$:    BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
11901  061070  110223                         MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
11902  061072  005720                         TST     (R0)+           ;;JUST INCREMENTING
11903  061074  020027  000010                 CMP     R0,#10          ;;CHECK THE TABLE INDEX
11904  061100  002746                         BLT     2$              ;;GO DO THE NEXT DIGIT
11905  061102  003002                         BGT     8$              ;;GO TO EXIT
11906  061104  010502                         MOV     R5,R2           ;;GET THE LSD
11907  061106  000764                         BR      6$              ;;GO CHANGE TO ASCII
11908  061110  105726                  8$:    TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
11909  061112  100003                         BPL     9$              ;;BR IF NO
11910  061114  116663  177777  177776         MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
```

```
11911  061122  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
11912  061124  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
11913  061126  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
11914  061130  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
11915  061132  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
11916  061134  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
11917  061136  104401  061164                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
11918  061142  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
11919  061150  012616                          MOV     (SP)+,(SP)
11920  061152  000002                          RTI                     ;;RETURN TO USER
11921  061154  023420                  $DTBL:  10000.
11922  061156  001750                          1000.
11923  061160  000144                          100.
11924  061162  000012                          10.
11925  061164  000004                  $DBLK:  .BLKW   4
11926
11927                                   .SBTTL  APT COMMUNICATIONS ROUTINE
11928
11929                                   ;;**********************************************************************
11930  061174  112767  000001  000236  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
11931  061202  112767  000001  000226  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
11932  061210  000403                          BR      $ATYC
11933  061212  112767  000001  000220  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
11934  061220                          $ATYC:
11935  061220  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11936  061222  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
11937  061224  105767  000206                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
11938  061230  001450                          BEQ     5$              ;;IF NOT:  BR
11939  061232  122767  000001  120076          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
11940  061240  001031                          BNE     3$              ;;IF NOT:  BR
11941  061242  132767  000100  120067          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
11942  061250  001425                          BEQ     3$              ;;IF NOT:  BR
11943  061252  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
11944  061256  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
11945  061264  005767  120026          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
11946  061270  001375                          BNE     1$              ;;IF NOT:  WAIT
11947  061272  010067  120034                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
11948  061276  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
11949  061300  001376                          BNE     2$
11950  061302  166700  120024                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
11951  061306  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
11952  061310  010067  120020                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
11953  061314  012767  000004  117774          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
11954  061322  000413                          BR      5$
11955  061324  017667  000004  000016  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
11956  061332  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
11957  061340  016746  116432                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
11958  061344  004767  176670                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
11959  061350  000000                  4$:     .WORD   0
11960  061352                          5$:
11961  061352  105767  000062          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
11962  061356  001416                          BEQ     12$             ;;IF NOT:  BR
11963  061360  005767  117752                  TST     $ENV            ;;RUNNING UNDER APT?
11964  061364  001413                          BEQ     12$             ;;IF NOT:  BR
11965  061366  005767  117724          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
11966  061372  001375                          BNE     11$             ;;IF NOT:  WAIT
```

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11967  061374  017667  000004  117716          MOV     @4(SP),$FATAL   ;;GET ERROR #
11968  061402  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
11969  061410  005267  117702                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
11970  061414  105067  000020          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
11971  061420  105067  000013                  CLRB    $LFLG           ;;CLEAR LOG FLAG
11972  061424  105067  000006                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
11973  061430  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
11974  061432  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
11975  061434  000207                          RTS     PC              ;;RETURN
11976  061436     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
11977  061437     000          $LFLG:  .BYTE   0               ;;LOG FLAG
11978  061440     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
11979          061442                  .EVEN
11980          000200          APTSIZE=200
11981          000001          APTENV=001
11982          000100          APTSPOOL=100
11983          000040          APTCSUP=040
11984
11985                          .SBTTL  TTY INPUT ROUTINE
11986
11987                          ;;**********************************************************************
11988                          .ENABL  LSB
11989
11990                          ;;**********************************************************************
11991                          ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
11992                          ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
11993                          ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
11994                          ;*WHEN OPERATING IN TTY FLAG MODE.
11995  061442  022767  000176  117470  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
11996  061450  001074                  BNE     15$             ;;BRANCH IF NO
11997  061452  105777  117466                  TSTB    @$TKS           ;;CHAR THERE?
11998  061456  100071                  BPL     15$             ;;IF NO, DON'T WAIT AROUND
11999  061460  117746  117462                  MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
12000  061464  042716  177600                  BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
12001  061470  022726  000007                  CMP     #7,(SP)+        ;;IS IT A CONTROL G?
12002  061474  001062                  BNE     15$             ;;NO, RETURN TO USER
12003  061476  126727  117432  000001          CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
12004  061504  001456                  BEQ     15$             ;;BRANCH IF YES
12005
12006  061506  104401  062051          $GTSWR: TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
12007  061512  104401  062056                  TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
12008  061516  016746  116454                  MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
12009  061522  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
12010  061524  104401  062067                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
12011  061530  005046                  19$:    CLR     -(SP)           ;;CLEAR COUNTER
12012  061532  005046                  CLR     -(SP)           ;;THE NEW SWR
12013  061534  105777  117404          7$:     TSTB    @$TKS           ;;CHAR THERE?
12014  061540  100375                  BPL     7$              ;;IF NOT TRY AGAIN
12015
12016  061542  117746  117400                  MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
12017  061546  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
12018
12019
12020
12021  061552  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
12022  061556  001005                  BNE     10$             ;;BRANCH IF NOT
```

```
12023  061560  104401  062044                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
12024  061564  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
12025  061570  000757                          BR      19$             ;;LET'S TRY IT AGAIN
12026
12027
12028  061572  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
12029  061576  001022                          BNE     16$             ;;BRANCH IF NO
12030  061600  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
12031  061604  001403                          BEQ     11$             ;;BRANCH IF YES
12032  061606  016677  000002  117324          MOV     2(SP),@SWR      ;;SAVE NEW SWR
12033  061614  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
12034  061620  104401  001313          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
12035  061624  126727  117305  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
12036  061632  001003                          BNE     15$             ;;BRANCH IF NOT
12037  061634  012777  000100  117302          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
12038  061642  000002          15$:    RTI                             ;;RETURN
12039  061644  004767  176602          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
12040  061650  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
12041  061654  002420                          BLT     18$             ;;BRANCH IF YES
12042  061656  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
12043  061662  003015                          BGT     18$             ;;BRANCH IF YES
12044  061664  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
12045  061670  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
12046  061674  001403                          BEQ     17$             ;;BRANCH IF YES
12047  061676  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
12048  061700  006316                          ASL     (SP)            ;;    CHAR OVER TO MAKE
12049  061702  006316                          ASL     (SP)            ;;    ROOM FOR NEW ONE.
12050  061704  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
12051  061710  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
12052  061714  000707                          BR      7$              ;;GET THE NEXT ONE
12053  061716  104401  001312          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
12054  061722  000720                          BR      20$             ;;SIMULATE CONTROL-U
12055                                  .DSABL  LSB
12056
12057
12058                                  ;;*****************************************************************
12059                                  ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
12060                                  ;*CALL:
12061                                  ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
12062                                  ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
12063                                  ;*                              ;;WITH PARITY BIT STRIPPED OFF
12064                                  ;
12065
12066  061724  011646          $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
12067  061726  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
12068  061734  105777  117204          1$:     TSTB    @$TKS           ;;WAIT FOR
12069  061740  100375                          BPL     1$              ;;A CHARACTER
12070  061742  117766  117200  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
12071  061750  042766  177600  000004          BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
12072  061756  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
12073  061764  001013                          BNE     3$              ;;BRANCH IF NO
12074  061766  105777  117152          2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
12075  061772  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
12076  061774  117746  117146                  MOVB    @$TKB,-(SP)     ;;GET CHARACTER
12077  062000  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
12078  062004  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
```

```
12079  062010  001366                          BNE     2$              ;;IF NOT DISCARD IT
12080  062012  000750                          BR      1$              ;;YES, RESUME
12081  062014  026627  000004  000140  3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
12082  062022  002407                          BLT     4$              ;;BRANCH IF YES
12083  062024  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
12084  062032  003003                          BGT     4$              ;;BRANCH IF YES
12085  062034  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
12086  062042  000002                  4$:     RTI                     ;;GO BACK TO USER
12087  062044  052536  005015     000 $CNTLU:  .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
12088  062051     136  006507  000012 $CNTLG:  .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
12089  062056  005015  053523  020122 $MSWR:   .ASCIZ  <15><12>/SWR = /
12090  062064  020075     000
12091  062067     040  047040  053505 $MNEW:   .ASCIZ  /  NEW = /
12092  062074  036440  000040
12093
12094                                  .SBTTL  TRAP DECODER
12095
12096                                  ;;*****************************************************************
12097                                  ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
12098                                  ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
12099                                  ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
12100                                  ;*GO TO THAT ROUTINE.
12101
12102  062100  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
12103  062102  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
12104  062106  005740                          TST     -(R0)           ;;BACKUP BY 2
12105  062110  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
12106  062112  006300                          ASL     R0              ;;POSITION FOR INDEXING
12107  062114  016000  062134                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
12108  062120  000200                          RTS     R0              ;;GO TO ROUTINE
12109
12110
12111                                  ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
12112
12113  062122  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
12114  062124  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
12115  062132  000002                          RTI                     ;;RESTORE THE PSW
12116
12117                                  .SBTTL  TRAP TABLE
12118
12119                                  ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
12120                                  ;*BY THE "TRAP" INSTRUCTION.
12121
12122                                  ;       ROUTINE
12123                                  ;       -------
12124  062134  062122                  $TRPAD: .WORD   $TRAP2
12125  062136  060240                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
12126  062140  060546                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
12127  062142  060522                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
12128  062144  060562                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
12129  062146  060750                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
12130
12131  062150  061512                          $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
12132
12133  062152  061442                          $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
12134  062154  061724                          $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
```

```
12135  062156  060144                          $SAVREG ;;CALL=SAVREG   TRAP+11(104411) SAVE R0-R5 ROUTINE
12136  062160  060202                          $RESREG ;;CALL=RESREG   TRAP+12(104412) RESTORE R0-R5 ROUTINE
12137  062162  062630                          .RSET   ;;CALL=RSETUP   TRAP+13(104413) ROUTINE TO RESET STACK AND FPS
12138  062164  062622                          .LPER   ;;CALL=LPERR    TRAP+14(104414) ROUTINE TO SET LOOP ON ERROR ADDRESS
12139           000032                  $TERM=.-$TRPAD
12140
12141                                   .SBTTL  POWER DOWN AND UP ROUTINES
12142
12143                                   ;;**********************************************************************
12144                                   ;POWER DOWN ROUTINE
12145  062166  012737  062344  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
12146  062174  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
12147  062202  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
12148  062204  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
12149  062206  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
12150  062210  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
12151  062212  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
12152  062214  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
12153  062216  017746  116716                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
12154  062222  010667  000122                  MOV     SP,$SAVR6       ;;SAVE SP
12155  062226  012737  062240  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
12156  062234  000000                          HALT
12157  062236  000776                          BR      .-2             ;;HANG UP
12158
12159                                   ;;**********************************************************************
12160                                   ;POWER UP ROUTINE
12161  062240  012737  062344  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
12162  062246  016706  000076                  MOV     $SAVR6,SP       ;;GET SP
12163  062252  005067  000072                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
12164  062256  005267  000066          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
12165  062262  001375                          BNE     1$              ;;OF  WORD
12166  062264  012677  116650                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
12167  062270  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
12168  062272  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
12169  062274  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
12170  062276  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
12171  062300  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
12172  062302  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
12173  062304  012737  062166  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
12174  062312  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
12175  062320  104401                          TYPE                    ;;REPORT THE POWER FAILURE
12176  062322  062700                  $PWRMG: .WORD   POWERM          ;;POWER FAIL MESSAGE POINTER
12177  062324  012716                          MOV     (PC)+,(SP)      ;;RESTART AT START
12178  062326  001466                  $PWRAD: .WORD   START           ;;RESTART ADDRESS
12179  062330  042766  000020  000002          BIC     #20,2(SP)       ;;CLEAR ''T'' BIT
12180  062336  005067  175100                  CLR     $TBIT           ;;CLEAR THE ''T'' BIT FLAG
12181  062342  000002                          RTI
12182  062344  000000                  $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
12183  062346  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
12184  062350  000000                  $SAVR6: 0                       ;;PUT THE SP HERE
12185
12186                                           .SBTTL  ERROR TYPE OUT ROUTINE
12187                                   ;;**********************************************************************
12188                                   ;;**********************************************************************
12189                                   ;*THIS ROUTINE IS CALLED TO TYPE AN ERROR MESSAGE WHICH IS INCLUDED
12190                                   ;*IN THE ERROR MESSAGE DATA TABLE. IT IS CALLED BY THE $ERROR ROUTINE
```

```
12191                                  ;*OR BY FIRST SETTING $ITEMB EQUAL TO THE ERROR TABLE ITEM TO BE PRINTED
12192                                  ;*OUT AND THEN EXECUTING A:
12193                                  ;*              JSR     PC,ERTYPE
12194                                  ;*
12195  062352  104401                 ERTYPE: TYPE                                    ;TYPE A CRLF
12196  062354  001313                         .WORD   $CRLF
12197  062356  113737  001102  001232        MOVB    @#$TSTNM,@#$TMP0
12198  062364  042737  177400  001232        BIC     #177400,@#$TMP0
12199  062372  013737  001116  001234        MOV     @#$ERRPC,@#$TMP1                ;GET PC OF CALL
12200  062400  010046                        MOV     R0,-(SP)                        ;SAVE R0
12201
12202  062402  113700  001114                MOVB    @#$ITEMB,R0                     ;GET THE ITEM NUMBER.
12203  062406  042700  177400                BIC     #177400,R0
12204  062412  001007                        BNE     MULT
12205  062414  104401  062466        PCTYP:  TYPE    ,EMSG
12206
12207  062420  013746  001116                MOV     @#$ERRPC,-(SP)                  ;IF ZERO THEN JUST
12208  062424  104402                        TYPOC                                   ;PRINT THE PC
12209  062426  000137  062462                JMP     @#ERT5
12210  062432  005300                MULT:   DEC     R0                              ;OTHERWISE MULT R0 BY 2 TO
12211                                                                                 ;GET ERROR MESSAGE POINTER
12212  062434  006300                        ASL     R0
12213  062436  062700  001442                ADD     #$ERRTB,R0
12214
12215  062442  011037  062452                MOV     (R0),@#2$                       ;PICK UP THE ADDRESS
12216  062446  001405                        BEQ     ERT5                            ;OF THE EM, ERROR MESSAGE
12217  062450  104401                        TYPE
12218  062452  000000                2$:     .WORD   0
12219  062454  104401                        TYPE
12220  062456  001313                        .WORD   $CRLF
12221  062460  000755                        BR      PCTYP
12222
12223  062462  012600                ERT5:   MOV     (SP)+,R0                        ;RESTORE R0.
12224  062464  000207                        RTS     PC                              ;AND RETURN.
12225
12226  062466  046106  040517  044524  EMSG: .ASCIZ /FLOATING POINT ERROR, STOPPED AT PC= /
12227  062474  043516  050040  044517
12228  062502  052116  042440  051122
12229  062510  051117  020054  052123
12230  062516  050117  042520  020104
12231  062524  052101  050040  036503
12232  062532  000040
12233                                  .EVEN
12234
12235
12236
12237                                          .SBTTL  FPP SPURIOUS TRAP TO 244 HANDLER
12238                                  ;;**************************************************************
12239                                  ;;**************************************************************
12240                                  ;*THIS ROUTINE HANDLES UNEXPECTED TRAPS TO THE FPP TRAP VECTOR AT 244.
12241                                  ;*THE LAST FPP INSTRUCTION EXECUTED AND ITS ADDRESS HAS BEEN RECORDED
12242                                  ;*THESE ALONG WITH THE FEC, FPS AND PC OF TRAP ARE REPORTED.
12243                                  ;*
12244  062534  011637  001236        FPSPUR: MOV     (SP),@#$TMP2                    ;SAVE PC OF TRAP.
12245  062540  022626                        CMP     (SP)+,(SP)+                     ;RESTORE SP.
12246  062542  170200                        STFPS   R0                              ;GET FPS
```

```
12247  062544  010037  001240                  MOV     R0,@#$TMP3
12248  062550  170300                          STST    R0                      ;GET FEC
12249  062552  010037  001242                  MOV     R0,@#$TMP4
12250  062556  104001                  1$:     ERROR   1               ;MOST LIKELY BAD FP1 CHIP
12251  062560  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
12252                                                                  ;SEE IF THE USER HAS EXPRESSED
12253                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
12254                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12255                                                                  ;THE USER TYPED CONTROL G?).
12256  062562  000137  057264                  JMP     @#$EOP
12257
12258
12259                                  .SBTTL  CPU SPURIOUS TRAP TO 4 HANDLER
12260                          ;;**************************************************************
12261                          ;;**************************************************************
12262                          ;*THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 4.
12263                          ;*
12264  062566  011637  001236  CPSPUR: MOV     (SP),@#$TMP2            ;SAVE PC OF TRAP.
12265  062572  022626                  CMP     (SP)+,(SP)+
12266  062574  104004                  1$:     ERROR   4
12267  062576  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
12268                                                                  ;SEE IF THE USER HAS EXPRESSED
12269                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
12270                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12271                                                                  ;THE USER TYPED CONTROL G?).
12272  062600  000137  057264                  JMP     @#$EOP
12273
12274
12275                                  .SBTTL  CPU SPURIOUS TRAP TO 10 HANDLER
12276                          ;;**************************************************************
12277                          ;;**************************************************************
12278                          ;*THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 10.
12279                          ;*
12280  062604  011637  001236  CPTWO:  MOV     (SP),@#$TMP2            ;SAVE PC OF TRAP.
12281  062610  022626                  CMP     (SP)+,(SP)+
12282  062612  104002                  1$:     ERROR   2
12283  062614  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
12284                                                                  ;SEE IF THE USER HAS EXPRESSED
12285                                                                  ;THE DESIRE TO CHANGE THE SOFTWARE
12286                                                                  ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
12287                                                                  ;THE USER TYPED CONTROL G?).
12288  062616  000137  057264                  JMP     @#$EOP
12289
12290
12291
12292
12293                                  .SBTTL  SET LOOP ON ERROR ADDRESS ROUTINE
12294                          ;;**************************************************************
12295                          ;;**************************************************************
12296                          ;*
12297  062622  011637  001110  .LPER:  MOV     (SP),@#$LPERR
12298  062626  000002                  RTI
12299
12300                                  .SBTTL  FLAG RESET AND CONSOLE TEST ROUTINE
12301                          ;;**************************************************************
12302                          ;;**************************************************************
```

```
12303                                   ;*THIS ROUTINE WILL BE CALLED AT THE END OF EACH TEST TO
12304                                   ;*RESET THE STACK, CLEAR THE FPS AND SEE IF THE USER HAS TYPED
12305                                   ;* CONTROL G ON THE TERMINAL. IF THE USER HAS TYPED CONTROL G AND
12306                                   ;*THERE IS NO PHYSICAL CONSOLE SWITCH REGISTER THEN THE CONTENTS
12307                                   ;*OF THE SOFTWARE SWITCH REGISTER WILL BE TYPED IN OCTAL ON THE
12308                                   ;*TELETYPE AND THE USER CAN MODIFY IT.
12309                                   ;*
12310  062630  023727  001140  177570   .RSET:  CMP     @#SWR,#177570          ;SEE IF THERE IS A PHYSICAL
12311                                                                          ;CONSOLE SWITCH REGISTER.
12312  062636  001001                           BNE     1$                     ;BRANCH IF NO.
12313  062640  104407                           CKSWR                          ;OTHERWISE TYPE THE CONTENTS
12314                                                                          ;OF THE PROGRAM VIRTUAL SWITCH REGISTER
12315                                                                          ;AND GIVE THE USER A CHANCE TO
12316                                                                          ;MODIFY IT.
12317  062642  012737  062534  000244   1$:     MOV     #FPSPUR,@#FPVECT
12318  062650  012737  062566  000004           MOV     #CPSPUR,@#ERRVECT
12319  062656  012737  062604  000010           MOV     #CPTWO,@#10
12320  062664  011600                           MOV     (SP),R0                ;SAVE RETURN ADDRESS.
12321  062666  012706  001100                   MOV     #STACK,SP              ;RESET THE STACK POINTER.
12322  062672  005004                           CLR     R4                     ;CLEAR THE FPS.
12323  062674  170104                           LDFPS   R4
12324  062676  000110                           JMP     (R0)                   ;RETURN.
12325
12326                                           .NLIST  BEX

                                        ;SPECIAL MESSAGES:

062700  050200  053517  051105   POWERM: .ASCIZ  <CRLF>'POWER FAILURE. PROGRAM RESTARTING.'<CRLF>
062745     000                   NULL:   .BYTE   0
062746  000011                   $TAB:   .ASCIZ  <TAB>
062750  020040     000           SPACE:  .ASCIZ  ' '

                                        ;ERROR MESSAGES:

062753     120  047522  040502   EM1:    .ASCIZ  /PROBABLY BAD FP1 CHIP/
063001     120  047522  040502   EM2:    .ASCIZ  /PROBABLY BAD HYBRID FP CHIP/
063035     120  047522  040502   EM3:    .ASCIZ  /PROBABLY BAD MMU CHIP/
063063     120  047522  040502   EM4:    .ASCIZ  /PROBABLY BAD MMU OR HYBRID FP CHIPS/
        000001                   .END
```

```
AAADON  040746
AAA1    037744
AAA10   040362
AAA11   040420
AAA12   040456
AAA13   040514
AAA2    040002
AAA3    040040
AAA4    040076
AAA5    040134
AAA6    040172
AAA7    040230
AAA8    040266
AAA9    040324
AADATO  023040
AADONE  023140
AAERR0  022472
AAERR1  022560
AAERR2  022614
AAERR3  022650
AAERR4  022660
AAERR5  022714
AAERR6  022750
AAERR7  023004
AAER10  022566
AAPAT0  023050
AAPAT1  023060
AAPAT2  023070
AAPAT3  023100
AAPAT4  023110
AAPAT5  023120
AAPAT6  023130
AA1     022112
AA10    022226
AA11    022256
AA12    022260
AA13    022276
AA14    022316
AA15    022336
AA16    022344
AA17    022350
AA2     022150
AA20    022354
AA21    022356
AA22    022410
AA23    022412
AA24    022432
AA25    022452
AA26    022460
AA27    022464
AA3     022152
AA4     022170
AA5     022210

AA6     022216
AA7     022224
ABASE = 000000
ACDW1 = 000000
ACDW2 = 000000
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AC1   =%000001
AC2   =%000002
AC3   =%000003
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AC5   =%000005
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ADDW13= 000000
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ADDW15= 000000
ADDW2 = 000000
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ADEVCT= 000000
ADEVM = 000000
ADONE   002444
AENV  = 000000
AENVM = 000000
AERR1   002336
AERR2   002350
AERR3   002402
AFATAL= 000000
AMADR1= 000000
AMADR2= 000000
AMADR3= 000000
AMADR4= 000000
AMAMS1= 000000
AMAMS2= 000000
AMAMS3= 000000
AMAMS4= 000000
AMSGAD= 000000
AMSGLG= 000000
AMSGTY= 000000
AMTYP1= 000000
AMTYP2= 000000
AMTYP3= 000000

AMTYP4= 000000
APASS = 000000
APRIOR= 000000
APTCSU= 000040
APTENV= 000001
APTSIZ= 000200
APTSPO= 000100
ASWREG= 000000
ATEST1= 000000
AUNIT = 000000
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AVECT2= 000000
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A11     002252
A12     002266
A2      002326
BBBDON  041450
BBBER1  041224
BBBER2  041310
BBBER3  041336
BBBER4  041364
BBBP1   041430
BBBP2   041440
BBB0    040754
BBB1    041010
BBB2    041036
BBB3    041066
BBB4    041114
BBB5    041152
BBB6    041160
BBDATO  026102
BBDONE  026232
BBER0   025570
BBER1   025630
BBER10  025610
BBER11  025644
BBER2   025666
BBER3   025704
BBER4   025740
BBER40  025754
BBER5   025774
BBER6   026012
BBER7   026046
BBER8   026064
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BBPAT1  026122
BBPAT2  026132
BBPAT3  026142
BBPAT4  026152
BBPAT5  026162
BBPAT6  026172
BBP10   026212

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BB11    025126
BB12    025136
BB13    025144
BB14    025156
BB15    025206
BB16    025232
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BB7     025064
BDONE   002546
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BERR1   002532
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BIT00 = 000001
BIT01 = 000002
BIT02 = 000004
BIT03 = 000010
BIT04 = 000020
BIT05 = 000040
BIT06 = 000100
BIT07 = 000200
BIT08 = 000400
BIT09 = 001000
BIT1  = 000002
BIT10 = 002000
BIT11 = 004000
BIT12 = 010000
BIT13 = 020000
BIT14 = 040000
BIT15 = 100000
BIT2  = 000004

BIT3  = 000010
BIT4  = 000020
BIT5  = 000040
BIT6  = 000100
BIT7  = 000200
BIT8  = 000400
BIT9  = 001000
BPTVEC= 000014
B1      002456
B2      002460
B3      002476
CCCDON  042460
CCC1    041454
CCC10   042050
CCC11   042104
CCC12   042140
CCC13   042174
CCC2    041510
CCC3    041544
CCC4    041600
CCC5    041634
CCC6    041670
CCC7    041724
CCC8    041760
CCC9    042014
CCDATO  024566
CCDONE  024726
CCER0   024130
CCER1   024164
CCER10  024476
CCER11  024514
CCER12  024532
CCER13  024550
CCER2   024222
CCER22  024236
CCER3   024260
CCER4   024276
CCER44  024312
CCER5   024334
CCER50  024200
CCER55  024350
CCER6   024370
CCER7   024424
CCER8   024442
CCER90  024146
CCP0    024576
CCP1    024606
CCP10   024676
CCP11   024706
CCP12   024716
CCP2    024616
CCP3    024626
CCP4    024636
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CCP5    024646      C35     002706      DD16    026564      EEDATO  030720      E3      003466
CCP6    024656      C4      002732      DD17    026614      EEDONE  031002      E4      003470
CCP7    024666      C45     002744      DD18    026636      EEEDON  044424      FDATI0  005372
CC1     023144      C5      002770      DD19    026656      EEER0   030512      FDATI1  005374
CC10    023360      C55     003010      DD2     026266      EEER1   030530      FDATI2  005376
CC11    023370      C6      003032      DD20    026666      EEER2   030566      FDATI3  005400
CC12    023376      C65     003046      DD21    026674      EEER3   030624      FDATI4  005402
CC13    023410      C7      003072      DD22    026706      EEER4   030662      FDATI5  005404
CC14    023440      C75     003114      DD23    026736      EEE1    043420      FDATI6  005406
CC15    023464      C8      003140      DD24    026760      EEE10   044014      FDATI7  005410
CC16    023504      C85     003152      DD25    027000      EEE11   044050      FDATO0  005414
CC17    023514      DDDATO  030076      DD26    027010      EEE12   044104      FDATO1  005416
CC18    023522      DDDDON  043414      DD27    027016      EEE13   044140      FDATO2  005420
CC19    023534      DDDONE  030226      DD3     026310      EEE2    043454      FDATO3  005422
CC2     023174      DDD1    042464      DD30    027030      EEE3    043510      FDATO4  005424
CC20    023564      DDD2    042540      DD31    027060      EEE4    043544      FDATO5  005426
CC21    023610      DDD3    042614      DD32    027102      EEE5    043600      FDATO6  005430
CC22    023630      DDD4    042670      DD33    027122      EEE6    043634      FDATO7  005432
CC23    023640      DDD5    042744      DD34    027132      EEE7    043670      FDONE   005456
CC24    023646      DDD6    043020      DD35    027140      EEE8    043724      FERR0   004200
CC25    023660      DDD7    043074      DD36    027156      EEE9    043760      FERR1   004236
CC26    023710      DDER0   027310      DD37    027206      EEP0    030730      FERR10  005016
CC27    023732      DDER1   027326      DD38    027230      EEP1    030742      FERR11  005052
CC28    023752      DDER10  027744      DD39    027250      EEP2    030752      FERR2   004334
CC29    023762      DDER11  030002      DD4     026330      EEP3    030762      FERR20  005072
CC3     023216      DDER12  030040      DD40    027260      EEP4    030772      FERR21  005210
CC30    023770      DDER2   027364      DD41    027266      EERR0   003514      FERR25  005232
CC31    024002      DDER3   027422      DD42    027304      EERR1   003532      FERR26  005350
CC32    024032      DDER4   027460      DD5     026340      EERR2   003546      FERR3   004374
CC33    024054      DDER5   027516      DD6     026346      EE1     030232      FERR4   004366
CC34    024074      DDER6   027554      DD7     026364      EE10    030452      FERR5   004472
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CC36    024112      DDER8   027650      DERR1   003316      EE12    030470      FERR7   004662
CC37    024124      DDER9   027706      DERR2   003412      EE13    030506      FER2    004340
CC4     023236      DDISP = 177570      DISPLA  001142      EE2     030262      FFDATO  031300
CC5     023246      DDONE   003436      DISPRE  000174      EE3     030304      FFDONE  031360
CC6     023254      DDP0    030106      DIVDSU  043154      EE4     030324      FFER0   031170
CC7     023266      DDP1    030116      DIVDT   043404      EE5     030334      FFER1   031204
CC8     023316      DDP2    030126      DIVFSU  042234      EE6     030342      FFER2   031242
CC9     023340      DDP3    030136      DIVFT   042450      EE7     030360      FFFDON  045154
CDONE   003174      DDP4    030146      DPAT3   013316      EE8     030410      FFF1    044430
CKSWR = 104407      DDP5    030156      DSWR  = 177570      EE9     030432      FFF2    044504
CMPSUB  040556      DDP6    030166      D1      003222      EMSG    062466      FFF3    044560
CMPTMP  040736      DDP7    030176      D10     003424      EMTVEC= 000030      FFF4    044634
CPSPUR  062566      DDP8    030206      D2      003246      EM1     062753      FFP0    031310
CPTWO   062604      DDP9    030216      D3      003250      EM2     063001      FFP1    031320
CR    = 000015      DD1     026236      D4      003254      EM3     063035      FFP2    031330
CRLF  = 000200      DD10    026436      D5      003266      EM4     063063      FFP3    031340
C1      002562      DD11    026446      D6      003302      ERRVEC= 000004      FFP4    031350
C15     002602      DD12    026464      D7      003312      ERTYPE  062352      FF1     031006
C2      002624      DD13    026514      D8      003362      FRT5    062462      FF10    031156
C25     002640      DD14    026536      D9      003374      E1      003452      FF11    031166
C3      002664      DD15    026546      EDONE   003576      E2      003466      FF2     031036
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FF3     031060
FF4     031066
FF5     031076
FF6     031126
FF7     031150
FPSPUR  062534
FPVECT= 000244
FXDAT0  005436
FXDAT1  005440
FXDAT2  005442
FXDAT3  005444
FXDAT4  005446
FXDAT5  005450
FXDAT6  005452
FXDAT7  005454
F1      003602
F10     004014
F11     004016
F12     004034
F13     004066
F135    004046
F14     004076
F15     004106
F16     004116
F17     004126
F2      003634
F20     004136
F21     004146
F22     004156
F23     004174
F3      003654
F4      003656
F5      003674
F6      003750
F7      003774
GAND0   011022
GAND1   011024
GAND2   011026
GAND3   011030
GCMP    010746
GDAT00  011042
GDAT01  011044
GDAT02  011046
GDAT03  011050
GDONE   011052
GFLAG1  010776
GFLAG2  011000
GGDAT0  036100
GGDONE  036220
GGER0   034376
GGER1   034474
GGER10  035206
GGER11  035254
GGER12  035322
GGER13  035370
GGER14  035436
GGER15  035534
GGER16  035602
GGER17  035650
GGER18  035716
GGER19  035764
GGER2   034542
GGER20  036032
GGER3   034610
GGER4   034656
GGER5   034660
GGER6   034726
GGER7   034774
GGER8   035072
GGER9   035140
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GGG4    050754
GGG5    051024
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GGG8    051214
GGG9    051264
GGP1    036110
GGP2    036120
GGP3    036130
GGP4    036140
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GGP6    036160
GGP7    036170
GGP8    036200
GGP9    036210
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GG11    033640
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GG14    033710
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GG16    033764
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GG18    034042
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GG27    034336
GG28    034372
GG3     033366
GG4     033376
GG5     033414
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GG8     033536
GG9     033546
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GOR1    011034
GOR2    011036
GOR3    011040
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GPAT01  011004
GPAT02  011006
GPAT03  011010
GPAT10  011012
GPAT11  011014
GPAT12  011016
GPAT13  011020
GRESET  010726
GSETUP  010650
GS1     010700
GTSWR = 104406
G1      007134
G10     007406
G11     007410
G12     007464
G13     007516
G14     007520
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G16     007626
G17     007630
G2      007166
G20     007704
G21     007736
G22     007740
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G24     010046
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G26     010124
G27     010156
G3      007170
G30     010160
G31     010234
G32     010266
G33     010270
G34     010344
G35     010376
G36     010400
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G4      007244
G40     010506
G41     010510
G42     010564
G43     010616
G44     010620
G5      007276
G6      007300
G7      007354
HADR    011602
HA1R    011656
HA1W    011606
HA2R    011666
HA2W    011616
HA3R    011676
HA3W    011626
HA4R    011706
HA4W    011636
HA5R    011716
HA5W    011646
HCLR    011532
HCLR1   011542
HCMP    011474
HCMP1   011514
HCMP2   011524
HDAT1   011726
HDAT2   011736
HDAT3   011746
HDAT4   011756
HDAT5   011766
HDONE   011776
HERROR  011550
HFLAG   011604
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HHER0   032152
HHER00  032266
HHER1   032220
HHER10  033014
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HHER3   032402
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HHER5   032516
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HH12    031642
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HH15    031714
HH16    031722
HH17    031740
HH18    031776
HH19    032020
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HH21    032046
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HH23    032120
HH24    032130
HH25    032146
HH3     031434
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HH9     031564
HSTD    011416
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HT     = 000011
HXDATO  037630
HXDONE  037740
HXER1   037216
HXER10  037506
HXER11  037540
HXER12  037560
HXER13  037610
HXER2   037256
HXER22  037272
HXER3   037306
HXER33  037322
HXER4   037336
HXER5   037236
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HXER7   037422
HXER8   037354
HXER9   037452
HXP1    037640
HXP2    037650
HXP3    037660
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HXP5    037700
HXP6    037710
HXP7    037720
HXP8    037730
HX1     036224
HX10    036432
HX11    036454
HX12    036474
HX13    036504
HX14    036512
HX15    036530
HX16    036556
HX165   036562
HX17    036610
HX18    036646
HX19    036666
HX2     036254
HX20    036676
HX21    036700
HX22    036730
HX23    036750
HX24    036770
HX25    037000
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HX27    037010
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HX9     036416
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H10     011322
H11     011354
H12     011406
H2      011100
H3      011110
H4      011162
H5      011204
H6      011236
H7      011270
IDATI0  006274
IDATI1  006276
IDATI2  006300
IDATI3  006302
IDATO0  006264
IDATO1  006266
IDATO2  006270
IDATO3  006272
IDONE   006304
IERR0   006044
IERR1   006126
IERR2   006146
IERR25  006170
IERR3   006220
IERR4   006174
IIIDON  046014
III1    045160
III2    045224
III3    045270
III4    045334
IOTVEC= 000020
IPAT10  006244
IPAT11  006246
IPAT12  006250
IPAT13  006252
IPAT20  006254
IPAT21  006256
IPAT22  006260
IPAT23  006262
I1      005464
I10     005640
I105    005646
I106    005642
I11     005650
I12     005652
I13     005666
I14     005722
I15     005724
I16     005726
I17     005744
I2      005502
I20     006004
I21     006020
I22     006024
I23     006040
I3      005542
I4      005544
I5      005546
I6      005572
I7      005606
JBUF0   012766
JBUF1   012770
JBUF2   012772
JBUF3   012774
JDATI0  012776
JDATI1  013000
JDATI2  013002
JDATI3  013004
JDATO0  013006
JDATO   013016
JDATO1  013010
JDATO2  013012
JDATO3  013014
JDAT1   013020
JDAT2   013022
JDAT3   013024
JDONE   013026
JERR0   012646
JERR1   012714
JERR2   012740
JJJDON  046754
JJJ1    046020
JJJ2    046104
JJJ3    046170
JJJ4    046254
J1      012540
J10     012666
J2      012564
J3      012566
J4      012570
J5      012624
J6      012632
J7      012644
KBUF0   013270
KBUF1   013272
KBUF2   013274
KBUF3   013276
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KDATI2  013264
KDATI3  013266
KDATO0  013300
KDATO1  013302
KDATO2  013304
KDATO3  013306
KDONE   013320
KERR0   013142
KERR1   013206
KERR2   013232
KKKDON  047616
KKK1    046760
KKK3    047024
KKK4    047070
KKK5    047134
KPAT0   013310
KPAT1   013312
KPAT2   013314
K1      013034
K10     013162
K2      013060
K3      013062
K4      013064
K5      013120
K6      013126
K7      013140
LDATI0  013620
LDATI1  013622
LDATI2  013624
LDATI3  013626
LDATO0  013632
LDATO1  013634
LDATO2  013636
LDATO3  013640
LDONE   013642
LERR1   013454
LERR2   013526
LERR3   013500
LF     = 000012
LLLDON  050560
LLL1    047622
LLL2    047706
LLL3    047772
LLL4    050056
LOOP    002160
LPAT10  013576
LPAT11  013600
LPAT12  013602
LPAT13  013604
LPAT20  013606
LPAT21  013610
LPAT22  013612
LPAT23  013614
LPERR  = 104414
L1      013326
L2      013366
L3      013370
L4      013372
L5      013442
L6      013450
MDATO0  014162
MDATO1  014164
MDATO2  014166
MDATO3  014170
MDONE   014172
MERR0   014016
MERR1   014054
MERR2   013770
MERR3   014102
MMMDON  055272
MMM1    054350
MMM2    054422
MMM3    054474
MMM4    054546
MMM5    054620
MODDD0  056300
MODDD1  056310
MODDOV  055712
MODDSU  053746
MODDT0  054324
MODDT1  054334
MODFD0  055252
MODFD1  055262
MODFOV  054676
MODFSU  051650
MODFT0  052206
MODFT1  052216
MODP1   052226
MPAT10  014142
MPAT11  014144
MPAT12  014146
MPAT13  014150
MPAT20  014152
MPAT21  014154
MPAT22  014156
MPAT23  014160
MULDSU  044714
MULDT   045144
MULFSU  044200
MULFT   044414
MULT    062432
M1      013646
M15     013666
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M2      013672
M3      013674
M4      013676
M5      013732
M6      013736
M7      013746
M8      013756
M9      013766
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NDATI1  014672
NDATI2  014674
NDATI3  014676
NDATO0  014626
NDATO1  014630
NDATO2  014632
NDATO3  014634
NDONE   014700
NERR0   014370
NERR1   014470
NERR10  014422
NERR11  014434
NERR2   014524
NERR20  014476
NERR3   014534
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NERR5   014554
NERR6   014600
NNNDON  056320
NNN1    055276
NNN2    055400
NNN3    055502
NNN4    055604
NPAT10  014660
NPAT11  014662
NPAT12  014664
NPAT13  014666
NPAT20  014646
NPAT21  014650
NPAT22  014652
NPAT23  014654
NULL    062745
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N11     014340
N12     014342
N13     014356
N14     014366
N2      014222
N3      014224
N4      014226
N5      014244
N6      014254
N7      014264
N8      014302
N9      014314
ODATI0  015374
ODATI1  015376
ODATI2  015400
ODATI3  015402
ODATO0  015332
ODATO1  015334
ODATO2  015336
ODATO3  015340
ODONE   015404
OERR0   015074
OERR1   015174
OERR10  015126
OERR11  015140
OERR2   015230
OERR20  015202
OERR3   015240
OERR4   015250
OERR5   015260
OERR6   015304
OPAT10  015364
OPAT11  015366
OPAT12  015370
OPAT13  015372
OPAT20  015350
OPAT21  015352
OPAT22  015354
OPAT23  015356
OPAT24  015360
OVDNTT  046744
OVDTT   050550
OVFNTT  046004
OVFTT   047606
OVUNDN  046344
OVUNDT  050146
OVUNFN  045404
OVUNFT  047204
O1      014704
O10     015034
O11     015044
O12     015046
O13     015062
O14     015072
O2      014730
O3      014732
O4      014734
O5      014752
O6      014762
O7      014772
O8      015006
O9      015020
PCTYP   062414
PDATI0  016040
PDATI1  016042
PDATI2  016044
PDATI3  016046
PDATO0  016050
PDATO1  016052
PDATO2  016054
PDATO3  016056
PDONE   016060
PERR0   015526
PERR1   015746
PERR10  015546
PERR11  015556
PERR12  015574
PERR13  015612
PERR14  015630
PERR15  015646
PERR16  015656
PERR17  015664
PERR2   015774
PERR20  015712
PERR21  015722
PERR22  015730
PIRQ   = 177772
PIRQVE= 000240
POWERM  062700
PPAT10  016030
PPAT11  016032
PPAT12  016034
PPAT13  016036
PR0    = 000000
PR1    = 000040
PR2    = 000100
PR3    = 000140
PR4    = 000200
PR5    = 000240
PR6    = 000300
PR7    = 000340
PS     = 177776
PSW    = 177776
PWRVEC= 000024
P1      015410
P2      015432
P3     = 015434
P4      015436
P5      015460
P6      015502
P7      015512
P8      015522
QDATI0  016550
QDATI1  016552
QDATI2  016554
QDATI3  016556
QDATO0  016540
QDATO1  016542
QDATO2  016544
QDATO3  016546
QDONE   016560
QERR0   016226
QERR1   016472
QERR11  016236
QERR12  016254
QERR13  016272
QERR14  016310
QERR15  016326
QERR16  016336
QERR17  016344
QERR2   016426
QERR20  016372
QERR21  016402
QERR22  016410
QERR3   016436
QERR4   016444
QPAT10  016520
QPAT11  016522
QPAT12  016524
QPAT13  016526
QPAT20  016530
QPAT21  016532
QPAT22  016534
QPAT23  016536
Q1      016064
Q10     016222
Q2      016106
Q3     = 016110
Q4      016112
Q5      016134
Q6      016156
Q7      016166
Q8      016200
Q9      016214
RDCHR  = 104410
RESREG= 104412
RESVEC= 000010
RSETUP= 104413
R6     =%000006
R7     =%000007
SADR    012506
SAVREG= 104411
SDATO0  012522
SDATO1  012524
SDATO2  012526
SDATO3  012530
SDONE   012532
SERR0   012212
SERR1   012422
SERR10  012232
SERR15  012312
SERR2   012352
SERR20  012332
SERR3   012376
SERR4   012270
SERR5   012454
SERR6   012364
SERR7   012410
SPACE   062750
SPAT10  012512
SPAT11  012514
SPAT12  012516
SPAT13  012520
STACK  = 001100
START   001466
STKLMT= 177774
SWR     001140
SWREG   000176
SW0    = 000001
SW00   = 000001
SW01   = 000002
SW02   = 000004
SW03   = 000010
SW04   = 000020
SW05   = 000040
SW06   = 000100
SW07   = 000200
SW08   = 000400
SW09   = 001000
SW1    = 000002
SW10   = 002000
SW11   = 004000
SW12   = 010000
SW13   = 020000
SW14   = 040000
SW15   = 100000
SW2    = 000004
SW3    = 000010
SW4    = 000020
SW5    = 000040
SW6    = 000100
SW7    = 000200
SW8    = 000400
SW9    = 001000
S1      012002
S10     012150
S11     012174
S12     012204
S2      012036
S3      012040
S4      012044
S5      012070
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S6          012100
S7          012106
S8          012142
S9          012144
TAB     =   000011
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TDATI0      007066
TDATI1      007070
TDATI2      007072
TDATI3      007074
TDATO0      007056
TDATO1      007060
TDATO2      007062
TDATO3      007064
TDONE       007076
TERR0       006644
TERR1       006726
TERR2       006746
TERR25      006762
TERR3       007012
TERR4       006774
TKVEC   =   000060
TPAT10      007036
TPAT11      007040
TPAT12      007042
TPAT13      007044
TPAT20      007046
TPAT21      007050
TPAT22      007052
TPAT23      007054
TPVEC   =   000064
TRAPVE=     000034
TRTVEC=     000014
TST1        002220
TST10       006306
TST11       007100
TST12       011054
TST13       012000
TST14       012534
TST15       013030
TST16       013322
TST17       013644
TST2        002446
TST20       014174
TST21       014702
TST22       015406
TST23       016062
TST24       016562
TST25       017676
TST26       020406
TST27       021202
TST3        002550
TST30       021606
TST31       022110
TST32       023142
TST33       024730
TST34       026234
TST35       030230
TST36       031004
TST37       031360
TST4        003176
TST40       033304
TST41       036222
TST42       037742
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TST46       043416
TST47       044426
TST5        003440
TST50       045156
TST51       046016
TST52       046756
TST53       047620
TST54       050562
TST55       052240
TST56       054346
TST57       055274
TST6        003600
TST60       056322
TST61       057264
TST7        005460
TYPDS   =   104405
TYPE    =   104401
TYPOC   =   104402
TYPON   =   104404
TYPOS   =   104403
T1          006310
T10         006444
T105        006452
T11         006454
T12         006456
T13         006472
T14         006526
T15         006530
T16         006532
T17         006550
T2          006330
T20         006610
T21         006624
T22         006626
T23         006640
T3          006370
T4          006372
T5          006374
T6          006420
T7          006434
UDONE       017676
UERR0       017342
UERR1       017366
UERR10      017374
UERR11      017436
UERR2       017452
UERR20      017460
UERR21      017522
UERR3       017536
UERR4       017566
UFLAG       017662
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UPAT01      017614
UPAT02      017616
UPAT03      017620
UPAT10      017622
UPAT11      017624
UPAT12      017626
UPAT13      017630
UPAT20      017632
UPAT21      017634
UPAT22      017636
UPAT23      017640
UPAT30      017642
UPAT31      017644
UPAT32      017646
UPAT33      017650
UPAT40      017652
UPAT41      017654
UPAT42      017656
UPAT43      017660
UROM1       017670
UROM2       017672
UROM3       017674
UTMP1       017664
UTMP2       017666
U0          016600
U1          016630
U10         017166
U11         017170
U12         017222
U13         017240
U14         017272
U15         017322
U16         017324
U2          016674
U3          016726
U4          016772
U5          017024
U6          017070
U7          017122
WDAP00      020374
WDAT01      020376
WDAT02      020400
WDAT03      020402
WDONE       020404
WPAT00      020364
WPAT01      020366
WPAT02      020370
WPAT03      020372
W1          017700
W10         020106
W11         020134
W12         020164
W13         020210
W14         020220
W15         020246
W16         020302
W17         020326
W2          017730
W20         020336
W3          017754
W4          017766
W5          020016
W6          020052
W7          020076
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XBUF        057114
XDAT00      021140
XDAT01      021142
XDAT02      021144
XDAT03      021146
XDONE       021200
XERR1       021024
XERR2       021106
XERR3       021052
XERR4       021122
XNEXT       057224
XPAT0       057214
XPAT0       057124
XPAT00      021150
XPAT01      021152
XPAT02      021154
XPAT03      021156
XPAT1       057134
XPAT10      021160
XPAT12      021164
XPAT13      021166
XPAT2       057144
XPAT20      021170
XPAT21      021172
XPAT22      021174
XPAT23      021176
XPAT3       057154
XPAT4       057164
XPAT5       057174
XPAT6       057204
XTMP        021136
XT1         056326
XT1A        056342
XT10        056754
XT11        057002
XT12        057030
XT13        057064
XT13B       057112
XT2         056344
XT2A        056364
XT2B        056402
XT3         056414
XT3A        056436
XT4         056446
XT4A        056476
XT4B        056510
XT5         056526
XT5A        056546
XT5B        056560
XT6         056576
XT6A        056624
XT6B        056636
XT7         056654
XT8         056702
XT9         056730
XX1         056324
X1          020410
X10         020602
X11         020616
X12         020652
X13         020676
X14         020704
X15         020720
X16         020754
X17         021000
X2          020444
X20         021006
X21         021022
X3          020470
X4          020476
X5          020514
X6          020550
X7          020574
YDAT00      021544
YDAT01      021546
YDAT02      021550
YDAT03      021552
YDONE       021604
YERR1       021404
YERR2       021446
YERR3       021510
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YPAT01  021556      $ATY3   061202      $ERROR  057744      $PASS   001324      $TMP1   001234
YPAT02  021560      $ATY4   061212      $ERRPC  001116      $PASTM  001460      $TMP10  001252
YPAT03  021562      $AUTOB  001134      $ERRTB  001442      $PWRAD  062326      $TMP11  001254
YPAT10  021564      $BASE   001372      $ERTTL  001112      $PWRDN  062166      $TMP12  001256
YPAT11  021566      $BDADR  001122      $ESCAP  001304      $PWRMG  062322      $TMP13  001260
YPAT12  021570      $BDDAT  001126      $ETABL  001336      $PWRUP  062240      $TMP14  001262
YPAT13  021572      $BELL   001306      $ETEND  001442      $QUES   001312      $TMP15  001264
YPAT20  021574      $CDW1   001376      $FATAL  001320      $RDCHR  061724      $TMP16  001266
YPAT21  021576      $CDW2   001400      $FFLG   061440      $RDSZ = 000001      $TMP17  001270
YPAT22  021600      $CHARC  060516      $FILLC  001156      $REGAD  001160      $TMP2   001236
YPAT23  021602      $CKSWR  061442      $FILLS  001155      $REG0   001162      $TMP20  001272
YTMP1   021536      $CLR.T  057360      $GDADR  001120      $REG1   001164      $TMP21  001274
YTMP2   021540      $CMTAG  001100      $GDDAT  001124      $REG10  001202      $TMP22  001276
YTMP3   021542      $CM1  = 000024      $GET42  057342      $REG11  001204      $TMP23  001300
Y1      021232      $CM2  = 000050      $GTSWR  061512      $REG12  001206      $TMP3   001240
Y2      021254      $CM3  = 000024      $HD   = 000003      $REG13  001210      $TMP4   001242
Y3      021300      $CM4  = 000024      $HIBTS  001452      $REG14  001212      $TMP5   001244
Y4      021316      $CNTLG  062051      $ICNT   001104      $REG15  001214      $TMP6   001246
Y5      021356      $CNTLU  062044      $ILLUP  062344      $REG16  001216      $TMP7   001250
Y6      021360      $CPUOP  001344      $INTAG  001135      $REG17  001220      $TN   = 000061
Y7      021374      $CRLF   001313      $ITEMB  001114      $REC2   001166      $TPB    001152
ZDAT00  022046      $DBLK   061164      $LF     001314      $REG20  001222      $TPFLG  001157
ZDAT01  022050      $DDW0   001402      $LFLG   061437      $REG21  001224      $TPS    001150
ZDAT02  022052      $DDW1   001404      $LOOP   057436      $REG22  001226      $TRAP   062100
ZDAT03  022054      $DDW10  001426      $LPADR  001106      $REG23  001230      $TRAP2  062122
ZDONE   022106      $DDW11  001430      $LPERR  001110      $REG3   001170      $TRP  = 000015
ZERR1   021752      $DDW12  001432      $MADR1  001350      $REG4   001172      $TRPAD  062134
ZERR2   022014      $DDW13  001434      $MADR2  001354      $REG5   001174      $TSTM   001456
ZFLAG   022040      $DDW14  001436      $MADR3  001360      $REG6   001176      $TSTNM  001102
ZPAT00  022056      $DDW15  001440      $MADR4  001364      $REG7   001200      $TYPDS  060750
ZPAT01  022060      $DDW2   001406      $MAIL   001316      $RESRE  060202      $TYPE   060240
ZPAT02  022062      $DDW3   001410      $MAMS1  001346      $RTNAD  057440      $TYPEC  060452
ZPAT03  022064      $DDW4   001412      $MAMS2  001352      $RTRN   057434      $TYPEX  060520
ZPAT10  022066      $DDW5   001414      $MAMS3  001356      $SAVRE  060144      $TYPOC  060546
ZPAT11  022070      $DDW6   001416      $MAMS4  001362      $SAVR6  062350      $TYPON  060562
ZPAT12  022072      $DDW7   001420      $MBADR  001454      $SCOPE  057464      $TYPOS  060522
ZPAT13  022074      $DDW8   001422      $MFLG   061436      $SETUP= 000137      $UNIT   001330
ZPAT20  022076      $DDW9   001424      $MNEW   062067      $STUP = 177777      $UNITM  001462
ZPAT21  022100      $DEVCT  001326      $MSGAD  001332      $SVLAD  057672      $USWR   001342
ZPAT22  022102      $DEVM   001374      $MSGLG  001334      $SVPC = 001452      $VECT1  001366
ZPAT23  022104      $DOAGN  057400      $MSGTY  001316      $SWR  = 177400      $VECT2  001370
ZTMP1   022042      $DTBL   061154      $MSWR   062056      $SWREG  001340      $XTSTR  057476
ZTMP2   022044      $ENDAD  057370      $MTYP1  001347      $SWRMK= 000000      $$GET4= 000001
Z1      021630      $ENDCT  057320      $MTYP2  001353      $SWRMS= 000200      $OFILL  060745
Z2      021652      $ENDMG  057447      $MTYP3  001357      $TAB    062746      .     = 063127
Z3      021676      $ENULL  057444      $MTYP4  001363      $TBIT   057442      .LPER   062622
Z4      021704      $ENV    001336      $MXCNT  057742      $TERM = 000032      .RSET   062630
Z5      021716      $ENVM   001337      $NULL   001154      $TESTN  001322      .$X   = 001452
Z6      021750      $EOP    057264      $NWTST= 000001      $TIMES  001302
$APTHD  001452      $EOPCT  057312      $OCNT   060744      $TKB    001146

. ABS.  063127      000
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ERRORS DETECTED: 0

MULE:CJKDCA,MULE:CJKDCA.SEQ/SOL/NL:TOC=CJKDCA.P11
RUN-TIME: 110 93 6 SECONDS
RUN-TIME RATIO: 563/211=2.6
CORE USED: 32K (63 PAGES)