DR11B

GENERAL NPR INTERFACE

MD-11-DZDRB-F

DA11B-PDP11 INTERPROC LINK

EP-DZDRB-F-DL

FICHE 1 OF 1

JUN 1978

digital

MADE IN USA

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDRB-F-D

PRODUCT NAME: DR11B - PDP11 GENERAL NPR INTERFACE
DA11B - PDP11 INTERPROCESSER LINK

DATE RELEASED: MAY 1978

MAINTAINER: DIAGNOSTIC ENGINEERING

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1. ABSTRACT

1.1 THIS IS A LOGIC TEST OF THE "NPR GENERAL INTERFACE" -DR11B.
THERE IS A SPECIAL MAINTENANCE FEATURE THAT ALLOWS TESTING
OF NPRS WITHOUT A CUSTOMERS DEVICE ATTACHED.
1.2 THERE IS A SECOND TEST INCLUDED FOR EXERCISING THE DA11B
INTERPROCESSER LINK. THE DR11B TEST SHOULD BE RUN IN
IN EACH COMPUTER BEFOUR TESTING THE DA11B.

2. REQUIREMENTS

2.1 EQUIPMENT

2.1.1 FOR THE DR11B

PDP-11 STANDARD COMPUTER
DR11B
NOTE: WITH OR WITHOUT HARDWARE SWITCH REGISTER
2.1.2 FOR THE DA11B

2 PDP-11 STANDARD COMPUTERS
1 DA11B CONSISTING OF 2 M7229 MODULES AND 2
BC08R CABLES.
NOTE: WITH OR WITHOUT HARDWARE SWITCH REGISTER

2.2 STORAGE

2.2.1 PROGRAM STORAGE - THE ROUTINE USES MEMORY
FROM 0 TO 14000.

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED.

4. DR11B STARTING PROCEDURE

4.1 CONTROL SWITCH SETTING

STARTING AT SA 200 ALL SWITCHES SHOULD BE DOWN OR ZERO.
NOTE: IF ALL SWITCHES ARE DOWN, IT IS ASSUMED THAT THE
BR LEVEL OF THE DR11B IS = 5. SEE OPERATIONAL SWITCH
SETTINGS, SECTION 5.1.2.

(A) 200 = TEST OF LOGIC USING MAINTENANCE FEATURE M968 IN C04,D04

LOAD PROGRAM INTO MEMORY.
LOAD STARTING ADDRESS
PRESS START.
THE PROGRAM WILL LOOP, 'END PASS' WILL BE
TYPED AT THE END OF THE PROGRAM.

NOTE: IF SOFTWARE SWITCH REGISTER IS SELECTED THEN THE
FOLLOWING WILL BE PRINTED:
        SWR= XXXXXX NEW=
(REFER TO SECTION 5.1 FOR OPERATOR OPTIONS)

5. DR11B OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

5.1.1 AT SA 200 .. THE INSTRUCTION AND LOGIC TEST.
WITH ALL SWITCHES DOWN THE PROGRAM WILL PRINT
OUT ON ERRORS AND CONTINUE IN TEST. ('END
PASS' TYPED AT COMPLETION OF A PASS)

5.1.2 SWITCH SETTINGS ARE

```
SW15 = 1 OR UP ... HALT ON ERROR
SW14 = 1 OR UP ... SCOPE LOOP
SW13 = 1 OR UP ... INHIBIT PRINTOUT
SW12 = 1 OR UP ... INHIBIT TRACE TRAP
SW11 = 1 OR UP ... INHIBIT ITERATIONS
SW02 TO SW00 = 4 ... BR LEVEL OF DR11B = 4
             = 5 ... BR LEVEL OF DR11B = 5
             = 6 ... BR LEVEL OF DR11B = 6
```

NOTE: IF SW02 TO SW00 = 0, THE BR LEVEL OF
THE DR11B IS ASSUMED TO BE = 5.

5.1.3 IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH
REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS
THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER.
IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES
AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH
REGISTER (LOC. 176) IS USED.

CONTROL:

THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH
REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY
DOING THE FOLLOWING:

1) TYPE CONTROL G <↑G>; THIS WILL ALLOW THE TTY TO ENTER DATA INTO
   LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.

2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS
   OF THE SOFTWARE SWITCH REGISTER.)

3) AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE
   OF THE FOLLOWING AT THE TTY:

   A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>.
      (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS

IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.

B) IF A CONTROL U <↑U> IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

5.2. SUBROUTINE ABSTRACTS

BEGIN SA 200

5.2.1 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST IN THE INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUB-TEST AS IT IS BEING ENTERED. IF A SCOPE LOOP IS REQUESTED, IT WILL JUMP TO THE START OF THE SUBTEST THAT THE SCOPE LOOP IS REQUESTED FOR. IF SCOPE LOOP IS NOT REQUESTED, THERE WILL BE EITHER A FIXED OR RANDOM NUMBER OF ITERATIONS ON THAT SUBTEST BEFORE THE NEXT SUBTEST IS ENTERED. SWITCH 11 ON A 1 INHIBITS ITERATION OF SUBTESTS.
NOTE: SUPPORTS ↑G ROUTINE FOR DYNAMIC LOADING OF SOFTWARE SWITCH REGISTER

5.2.2 HALT

IS A ROUTINE THAT PRINTS-OUT AN ADDRESS THAT TAGS THE FAILING SUBTEST THE CP STATUS REGISTER AND THE DR11B STATUS REGISTER AT THE TIME OF FAILURE.
NOTE: SUPPORTS ↑G ROUTINE FOR DYNAMIC LOADING OF SOFTWARE SWITCH REGISTER

5.2.3 LODBUF

THE INBUF BUFFER IS LOADED WITH AN INCREMENTING PATTERN (0,1,2,3,...) BEGINNING AT THE STARTING ADDRESS OF INBUF. THE NUMBER OF WORDS LOADED IS DETERMINED BY THE CONTENTS OF BUFLEN.

5.2.4 CHKBFF

THE CHKBUF BUFFER IS LOADED WITH A MODIFIED INCREMENTING PATTERN (0,0,2,2,4,4,6,6,...) BEGINNING AT THE STARTING ADDRESS OF CHKBUF. THE NUMBER OF WORDS LOADED IS DETERMINED BY THE CONTENTS OF BUFLEN. THIS BUFFER IS LOADED ONLY FOR TESTS WHICH USE THE MAINTENANCE MODE OF THE DR11-B WHICH HAS A SPECIAL ALTERNATING DATI-DATO SEQUENCE OF OPERATION.

5.2.5 INTA

THE IE BIT IS CLEARED IN THE DRST THEN THE DRST IS CHECKED FOR THE ABSENCE OF AN ERROR AND THE PRESENCE OF READY. THE DRWC IS CHECKED TO SEE

OF THE DRBA ARE CALCULATED AND CHECKED. THERE IS A JSR TO THE NORMAL SUB-ROUTINE BEFORE THIS ROUTINE IS EXITED. THE PROGRAM WILL HALT IF ERROR IS SET, READY IS CLEAR, OR READY AND ERROR ARE CLEAR.

5.2.6 DATCHK

THIS ROUTINE IS ENTERED TO CHECK INBUF AFTER A MAINTENANCE MODE OPERATION. THE CONTENTS OF INBUF AND THE CONTENTS OF CHKBUF ARE CHECKED TO SEE THAT THEY ARE THE SAME. THE NUMBER OF COMPARISONS MADE IS DETERMINED BY THE CONTENTS OF BUFLEN.

5.2.7 NORMAL

THE ROUTINE IS ENTERED FROM INTA AND FROM SOME TESTS WHICH DON'T USE INTA. THE NUMBER OF THE DRINV+2 IS PUT INTO DRINV AND THE DRVS IS CLEARED. IF THE DR11-B INTERRUPTS UNDER THESE CONDITIONS THE PDP-11 WILL HALT AT DRVS. THE PROCESSOR STATUS WORD IS RESTORED TO LEVEL 7 AND THE ROUTINE IS EXITED.

5.2.8 DATOCK

AFTER A STRING OF DATO'S HAS BEEN COMPLETED THIS ROUTINE CHECKS THAT THE CORRECT DATA PATTERN (52525) WAS TRANSFERRED TO INBUF. THE NUMBER OF COMPARISONS MADE IS DETERMINED BY THE CONTENTS OF BUFLEN. AN ADDITIONAL CHECK IS MADE ON BUFLEN+2 TO INSURE THAT TOO MANY WORDS WEREN'T TRANSFERRED.

5.2.9 ERRCHK

THIS ROUTINE CLEARS IE AND HALTS IF ERROR IS SET.

5.2.10 TRAPCATCHER

THIS IS A SERIES OF INSTRUCTIONS STARTING AT LOCATION 0 DESIGNED TO DETECT AND ISOLATE UNEXPECTED TRAPS AND INTERRUPTS TO THE TRAP AND INTERRUPT VECTOR AREA OF MEMORY.

EACH VECTOR ENTRANCE ADDRESS IS LOADED WITH THE ADDRESS OF THE NEXT LOCATION. THE NEXT LOCATION IS LOADED WITH A HALT (000000). THUS AN ILLEGAL TRAP OR INTERRUPT WILL CAUSE A HALT AT THE TRAP LOCATION PLUS TWO.

IF A HALT OCCURS IN THE TRAP OR INTERRUPT AREA, EXAMINE REGISTER SIX, IT WILL CONTAIN THE CURRENT STACK ADDRESS. THE CONTENTS OF THE CURRENT STACK ADDRESS IS THE VALUE OF

5.3 PROGRAM AND/OR OPERATOR ACTION

5.3.1 LOADING AND STARTING AT 200 WITH ALL SWITCHES DOWN IS THE INSTRUCTION AND LOGIC TEST. IF AN ERROR IS DETECTED HERE, THERE WILL BE A PRINTOUT. WHEN AN ERROR IS DETECTED AND IT IS NECESSARY TO SCOPE ON IT, PLACE SW15 UP TO HALT ON ERROR, THEN SW14 UP TO LOOP ON ERROR, THEN SW13 UP TO DELETE PRINTOUTS.

6. DR11B ERRORS

6.1 ERROR PRINTOUT

THE PC OF THE FAILING TEST AND THE CP STATUS WILL BE PRINTED.

6.2 ERROR RECOVERY

DEPRESS CONTINUE TO RESTART SECTION

7. DR11B RESTRICTIONS

7.1 STARTING RESTRICTION

NONE

7.2 OPERATIONAL RESTRICTION

M968 MUST BE IN SLOTS C04/D04 - FOR DIAGNOSTIC TESTING
SHOULD BE IN A02/B02 FOR NORMAL USER OPERATION.

8. MISCELLANEOUS

8.1 EXECUTION TIME

ABOUT 2 MINUTES

9. PROGRAM DESCRIPTION

THE FOLLOWING IS A GENERAL LIST OF FUNCTIONS TESTED.

```
CAN ALL REG BE ADDRESSED WITHOUT ERROR
RESET CLEAR DRWC
RESET CLEAR DRBA
CAN ALL DRWC BITS BE SET
CAN 15-1 IN DRBA BE SET
FNCT1 SET & CLEARED
FNCT2 SET & CLEARED
FNCT3 SET & CLEARED
XBA16 SET & CLEARED
XBA17 SET & CLEARED
IE    SET & CLEARED
```

```
MAINT SET & CLEARED
ALL DRST R/W BITS CAN BE SET & CLEARED
ALL DRST R/W SET, RESET TO 0, RDY IS SET, NEX IS
CLEARED, GO IS 0
DRWC HOLD ALT. 0'S & 1'S AND ALT. 1'S & 0'S
DRBA HOLD ALT. 0'S & 1'S AND ALT. 1'S & 0'S
INC PATTERN TO WRAP-AROUND IN DRWC
INC PATTERN TO WRAP-AROUND IN DRBA
NO INT. AT LEVEL 7
NO INT. AT LEVEL 6
NO INT. AT LEVEL 5
DOES INT. AT LEVEL 4
NO MAINTBRD A02/B02
MAINTBRD C04/D04
FNCT BITS CONTROL DSTAT BITS
RESET 0'S DRDB
ALL DRDB BITS CAN BE SET
DRDB HOLD  ALT. 1'S & 0'S AND ALT. 0'S & 1'S
INC TO WRAP-AROUND IN DRDB
RESET SETS ONLY RDY IN DRST
BA00 READS AS 0
1 DAT1 NPR
1 DAT0 NPR
BA0F FORCES ERROR & IS CLEARED BY CLEARING DRBA OR RESET
GO CLEARS RDY
DAT0 TO DIODE MEM CAUSES NEX
DO WITHOUT CLEARING PREVIOUS ERROR CAUSES ANOTHER INT.
10 DAT1'S (BURST)
10 DAT0'S (BURST)
200 DAT1'S (BURST)
200 DAT0'S (BURST)
200 DAT1'S (NON-BURST)
200 DAT0'S (NON-BURST)
FUNCT BITS INC WITH MAINT MODE XFERS
10 MAINT MODE XFERS
200 MAINT MODE XFERS
```

10. LISTING

11. FLOW CHART(S)

12. DA11B STARTING PROCEDURE

12.1 THERE ARE TWO STARTING LOCATIONS: ONE FOR THE COMPUTER THAT WILL BE THE SLAVE AND ANOTHER FOR THE COMPUTER THAT WILL BE THE MASTER.

12.2 SLAVE COMPUTER, LOAD ADDRESS 1006 AND PRESS START. PROCESSOR WILL HALT.

12.3 MASTER COMPUTER, LOAD ADDRESS 1000 AND PRESS START. PROCESSOR WILL HALT.

12.4 SLAVE COMPUTER, PRESS CONTINUE (OR CNTRL AND CONT ON AN 11/34 OR 11/04), (ON SWITCHLESS PROCESSOR TOGGLE THE HALT/CONT SWITCH).

12.5 MASTER COMPUTER, PRESS CONTINUE (OR CNTRL AND CONT ON AN 11/34 OR 11/04, (ON SWITCHLESS PROCESSOR TOGGLE THE HALT/CONT SWITCH).

13. DA11B OPERATING PROCEDURE

13.1 THE PROGRAM WILL LOOP AFTER STARTING AND PRINT OUT ANY ERRORS. THE PROGRAM WILL HALT AFTER NON RECOVERABLE ERRORS.

13.2 THE MAINT MODULE MUST BE IN A02/B02 AND THE THE DA11B MUST BE IN C04/D04 .

14. DA11B PROGRAM DISCRIPTION

14.1 THE SLAVE COMPUTER STARTS BY ENTERING A BACKGROUND TO WAIT FOR AN INTERUPT WITH THE INTERUPT ENABLED. THE FIRST INTERUPT THAT COMES SHOULD BE THE READY INTERUPT SET UP WHEN THE MASTER HIT THE START KEY. THE INTERUPT CAUSES THE SLAVE TO ENTER THE INTERUPT SERVICE ROUTINE.

14.2 THE INTERUPT SERVICE ROUTINE DETERMINS WHAT INTERUPT CAME UP AND IF IT SHOULD HAVE COME UP. IF THE INTERUPT WAS THE ONE EXPECTED THAN THE THAN THE PROGRAM GOES TO THE TO THE PROPER JOB ROUTINE, SJOBXX FOR SLAVE SERVICE AND JOBXX FOR THE MASTER ROUTINE.

14.3 THE NEXT THING THAT SHOULD HAPPEN IS THE MASTER SHOULD ISSUE AN INTERUPT TO THE SLAVE . THIS IS A SIGNAL FOR THE SLAVE TO ACCEPT THE WORD COUNT,OFFSET,AND TWO CHECK SUM WORDS. THE SLAVE ACCEPTS A WORD AT A TIME FROM THE DATA BUFFER EACH TIME THE MASTER TOGGLES FUNCTION BIT 3. EACH TIME IT READS A WORD THE SLAVE SENDS THE WORD BACK TO THE MASTER FOR VERIFICATION.

14.4 AFTER THE SLAVE HAS RECIEVED ALL THE PARAMETERS IT SETS ITS DIRECTION BIT TO THE OPPOSIT DIRECTION AS THE MASTER AND STARTS THE NPR TRANSFER.

14.5 THE MASTER SETS UP THE TYPE OF TRANSFERS AND CHECKS THE DATA WHEN IT COMES BACK FROM THE SLAVE.

15. DA11B ERRORS

15.1 THE PC OF THE FAILING TEST, THE CP STATUS AND THE DR11B STATUS REGISTER WILL BE PRINTED AFTER AN ERROR.

15.2 THERE IS NO ERROR RECOVERY FOR THE DA11B TEST BECAUSE THE OTHER COMPUTER WILL GET OUT OF SINC WHEN AN

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                .TITLE  MAINDEC-11-DZDRB-F
                                ;*COPYRIGHT (C) 1971,1977
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*PROGRAM BY POMFRET,JONES,CONDON
                                ;*
                                ;*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
                                ;;*****************************************************************
                                ;       MODIFIED FOR SOFTWARE SWITCH REGISTER
                                ;       INCLUDING DYNAMIC LOADING OF SWR
                                ;
                                ;       MODIFIED TO ELIMINATE BAOF ERROR WHEN
                                ;       DMA TRANSFERS CROSS A 32K BOUNDRY
                                ;;*****************************************************************
                                ;;*****************************************************************

000240                          NOP=000240
104400                          SCOPE=TRAP
104000                          HLT=EMT
000001                          BIT0=000001
000002                          BIT1=000002
000004                          BIT2=000004
000010                          BIT3=000010
000020                          BIT4=000020
000040                          BIT5=000040
000100                          BIT6=000100
000200                          BIT7=000200
000400                          BIT8=000400
001000                          BIT9=001000
002000                          BIT10=002000
004000                          BIT11=004000
010000                          BIT12=010000
020000                          BIT13=020000
040000                          BIT14=040000
100000                          BIT15=100000

000004                          BUSERR=000004

                        ;LOAD TRAP CATCHER INTO 0 THRU 777.

000000                          .=0
000030                          .=30
000030  011366                  PRINT
000032  000340                  340
000034                          .=34
000034  012154                  $SCOPEC
000036  000340                  340
000046                          .=46
```

```
                    000052                          .=52
000052  000000      000000                          0
                    000176                          .=176
000176  000000      000000                          SWREG:: 0
                    000200                          .=200
000200  012706  014100  000000                      MOV     #BUFF,%6        ;SET UP STACK LIMIT
000204  005077  000606  000000                      CLR     @PSW
000210  023737  000042  000046  000000              CMP     @#42,@#46       ;ARE WE IN ACT11 AUTO MODE?
000216  001404  000000                              BEQ     1$              ;SKIP TITLE IF YES
000220  012702  012715  000000                      MOV     #$TITLE,%2      ;PRINT THE TITLE
000224  004767  012544  000000                      JSR     %7,TTOUT
000230  000167  000646  000000          1$:         JMP     SUSWR
                    001000                          .=1000

                                    ;;**********************************************************************
                                    ;       START OF BACK-TO-BACK DR11-B
                                    ;;**********************************************************************

001000  000000  000000              MSTART: HALT                    ;MASTER START
001002  000167  006502                      JMP     MS1
001006  000000  000000              SSTART: HALT                    ;SLAVE START
001010  000167  006554                      JMP     SS1
001014  177570  000000              SR:     177570
001016  177776  000000              PSW:    177776
001020  172410  000000              DRWC:   172410
001022  172412  000000              DRBA:   172412
001024  172414  000000              DRST:   172414
001026  172416  000000              DRDB:   172416
001030  000126  000000              DRVS:   126
001032  000240  000000              DRINL:  240
001034  000124  000000              DRINV:  124
001036  052525  000000              NPR1:   52525
001040  173000  000000              DIOMEM: 173000
001042  014102  000000              INBUF:  XINBUF
001044  015104  000000              CHKBUF: XCHKBU
001046  000000  000000              BUFLEN: HALT
001050  000000  000000              LENCHK: HALT
001052  000000  000000              BRWAIT: HALT
001054  000000  000000              WCLEN:  HALT
001056  000000  000000              RDYCHK: HALT
001060  177560  000000              TKS:    177560
001062  177562  000000              TKB:    177562
001064  177564  000000              TPS:    177564
001066  177566  000000              TPB:    177566
001070  000000  000000              FNCCNT: HALT
001072  000000  000000              INBUF1: HALT
001074  000000  000000              PASCNT: 0                       ;NUMBER OF PASSES COMPLETED
001076  000000  000000              TEMP:   0                       ;TEMPORARY STORAGE
001100  000000  000000              TEMP2:  0                       ;TEMPORARY STORAGE

001102  013746  000006  000000      SUSWR:  MOV     @#6,-(SP)       ;SAVE VECTORS
001106  013746  000004  000000              MOV     @#4,-(SP)
```

```
                                                ;REFERENCE HARDWARE SWITCH REGISTER
                                                ;ADJUST STACK
                                                ;POINT TO SOFTWARE SWITCH REG
                                                ;RESTORE VECTORS
                                                ;IS SWREG USED
                                                ;ARE WE IN AUTO MODE?
                                                ;IF SO, SKIP SWREG INPUT
                                                ;ALLOW SWREG TO BE LOADED
                                                ;PROC. AT LEVEL #7

;;*****************************************************************
;       TEST 0 CAN ALL DR11-B REG BE ADDRESSED WITHOUT ERROR?
;;*****************************************************************

                                                ;BUS ERROR VECTOR TO ERRA
                                                ;PC TO R0
                                                ;ADDRESS DRWC
                                                ;PC TO R0
                                                ;ADDRESS DRBA
                                                ;PC TO R0
                                                ;ADDRESS DRST
                                                ;PC TO R0
                                                ;ADDRESS DRDB
                                                ;MADE IT - BRANCH OVER HALT
                                                ;BUS ERROR, R0 HAS PC OF ERROR
                                                ;RESTORE #6 TO BUS ERROR VECTOR

;;*****************************************************************
;       TEST 1 DOES RESET CLEAR DRWC?
;;*****************************************************************

                                                ;ALL ONES TO DRWC
                                                ;INIT
                                                ;LOOKING FOR Z-BIT TO SET
                                                ;DID DRWC GET CLEARED?
                                                ;DRWC NOT CLEAR

;;*****************************************************************
;       TEST2 DOES RESET CLEAR DRBA?
```

```
                                                SCOPE
001320  104400
001322  012777  177777  177472                MOV     #-1,@DRBA       ;ALL ONES TO DRBA
001330  004767  010730                          JSR     %7,CKSWR
001334  000005                                  RESET                   ;INIT
001336  005777  177460                          TST     @DRBA           ;LOOKING FOR Z-BIT TO SET
001342  001401                                  BEQ     .+4             ;DID DRBA GET CLEARED?
001344  104000                                  HLT                     ;DRBA NOT CLEAR


                        ;;**************************************************************
                        ;       TEST3 CAN ALL DRWC BITS BE SET?
                        ;;**************************************************************

001346  104400                                  SCOPE
001350  012767  004000  010664                  MOV     #4000,ICOUNT
001356  012777  177777  177434                  MOV     #-1,@DRWC       ;SET ALL BITS IN DRWC
001364  022777  177777  177426                  CMP     #-1,@DRWC       ;LOOKING FOR Z-BIT TO SET
001372  001401                                  BEQ     .+4             ;SEE IF ALL BITS GOT SET
001374  104000                                  HLT                     ;ALL BITS AREN'T SET


                        ;;**************************************************************
                        ;       TEST4 CAN BITS 15-01 IN DRBA BE SET?
                        ;;**************************************************************

001376  104400                                  SCOPE
001400  012777  177776  177414                  MOV     #-2,@DRBA       ;SET BITS 15-01 IN DRBA
001406  022777  177776  177406                  CMP     #-2,@DRBA       ;LOOKING FOR Z-BIT TO SET
001414  001401                                  BEQ     .+4             ;SEE IF BITS 15-01 GOT SET
001416  104000                                  HLT                     ;BITS 15-01 AREN'T SET


                        ;;**************************************************************
                        ;       TEST6 TEST THAT FNCT1 CAN BE SET AND CLEARED
                        ;;**************************************************************

001420  104400                                  SCOPE
001422  052777  000002  177374                  BIS     #BIT1,@DRST     ;SET FNCT1
001430  032777  000002  177366                  BIT     #BIT1,@DRST     ;TEST FNCT1
001436  001001                                  BNE     .+4             ;IS IT SET?
001440  104000                                  HLT                     ;FNCT1 IS CLEAR
001442  042777  000002  177354                  BIC     #BIT1,@DRST     ;CLEAR FNCT1
001450  032777  000002  177346                  BIT     #BIT1,@DRST     ;TEST FNCT1
001456  001401                                  BEQ     .+4             ;WAS IT CLEAR
001460  104000                                  HLT                     ;FNCT1 WAS SET


                        ;;**************************************************************
                        ;       TEST7 TEST THAT FNCT2 CAN BE SET AND CLEARED
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                                ;;*****************************************************************
                                ;       TEST10 TEST THAT FNCT3 CAN BE SET AND CLEARED
                                ;;*****************************************************************

001524  104400                          SCOPE
001526  052777  000010  177270          BIS     #BIT3,@DRST     ;SET FNCT3
001534  032777  000010  177262          BIT     #BIT3,@DRST     ;TEST FNCT3
001542  001001                          BNE     .+4             ;IS IT SET?
001544  104000                          HLT                     ;FNCT3 IS CLEAR
001546  042777  000010  177250          BIC     #BIT3,@DRST     ;CLEAR FNCT3
001554  032777  000010  177242          BIT     #BIT3,@DRST     ;TEST FNCT3
001562  001401                          BEQ     .+4             ;WAS IT CLEAR?
001564  104000                          HLT                     ;FNCT3 WAS SET

                                ;;*****************************************************************
                                ;       TEST11 TEST THAT XBA16 CAN BE SET AND CLEARED
                                ;;*****************************************************************
001566  104400                          SCOPE
001570  052777  000020  177226          BIS     #BIT4,@DRST     ;SET XBA16
001576  032777  000020  177220          BIT     #BIT4,@DRST     ;TEST XBA16
001604  001001                          BNE     .+4             ;IS IT SET?
001606  104000                          HLT                     ;XBA16 IS CLEAR
001610  042777  000020  177206          BIC     #BIT4,@DRST     ;CLEAR XBA16
001616  032777  000020  177200          BIT     #BIT4,@DRST     ;TEST XBA16
001624  001401                          BEQ     .+4             ;IS IT CLEAR
001626  104000                          HLT                     ;XBA16 WAS SET

                                ;;*****************************************************************
                                ;       TEST12 TEST THAT XBA17 CAN BE SET AND CLEARED
                                ;;*****************************************************************
001630  104400                          SCOPE
001632  052777  000040  177164          BIS     #BIT5,@DRST     ;SET XBA17
001640  032777  000040  177156          BIT     #BIT5,@DRST     ;TEST XBA17
001646  001001                          BNE     .+4             ;IS IT SET?
001650  104000                          HLT                     ;XBA17 IS CLEAR
001652  042777  000020  177144          BIC     #BIT4,@DRST     ;CLEAR XBA17
001660  032777  000020  177136          BIT     #BIT4,@DRST     ;TEST XBA17
001666  001401                          BEQ     .+4             ;IS IT CLEAR?
001670  104000                          HLT                     ;XBA17 WAS SET
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                                ;       TEST13 TEST THAT IE CAN BE SET AND CLEARED
                                ;;*************************************************************
001672  104400                          SCOPE
001674  052777  000100  177122          BIS     #BIT6,@DRST     ;SET IE
001702  032777  000100  177114          BIT     #BIT6,@DRST     ;TEST IE
001710  001001                          BNE     .+4             ;IS IT SET?
001712  104000                          HLT                     ;IE IS CLEAR
001714  042777  000100  177102          BIC     #BIT6,@DRST     ;CLEAR IE
001722  032777  000100  177074          BIT     #BIT6,@DRST     ;TEST IE
001730  001401                          BEQ     .+4             ;IS IT CLEAR?
001732  104000                          HLT                     ;IE WAS SET

                                ;;*************************************************************
                                ;       TEST14 TEST THAT CYCLE CAN BE SET AND CLEARED
                                ;;*************************************************************
001734  104400                          SCOPE
001736  052777  000400  177060          BIS     #BIT8,@DRST     ;SET CYCLE
001744  032777  000400  177052          BIT     #BIT8,@DRST     ;TEST CYCLE
001752  001001                          BNE     .+4             ;IS IT SET?
001754  104000                          HLT                     ;CYCLE WAS CLEAR
001756  042777  000400  177040          BIC     #BIT8,@DRST     ;CLEAR CYCLE
001764  032777  000400  177032          BIT     #BIT8,@DRST     ;TEST CYCLE
001772  001401                          BEQ     .+4             ;IS IT CLEAR?
001774  104000                          HLT                     ;CYCLE WAS SET

                                ;;*************************************************************
                                ;       TEST15 TEST THAT MAINT CAN BE SET AND CLEARED
                                ;;*************************************************************
001776  104400                          SCOPE
002000  052777  010000  177016          BIS     #BIT12,@DRST    ;SET MAINT
002006  032777  010000  177010          BIT     #BIT12,@DRST    ;TEST MAINT
002014  001001                          BNE     .+4             ;IS IT SET?
002016  104000                          HLT                     ;MAINT WAS CLEAR
002020  042777  010000  176776          BIC     #BIT12,@DRST    ;CLEAR MAINT
002026  032777  010000  176770          BIT     #BIT12,@DRST    ;TEST MAINT
002034  001401                          BEQ     .+4             ;IS MAINT CLEAR?
002036  104000                          HLT                     ;MAINT WAS SET

                                ;;*************************************************************
                                ;       TEST 16 TEST THAT ALL DRST R/W BITS CAN BE SET AND CLEARED
                                ;;*************************************************************
002040  104400                          SCOPE
002042  052777  010576  176754          BIS     #10576,@DRST    ;SET FOLLOWING: MAINT(12), CYCLE(08),IE(06),XBA17(05),
                                                                ;               XBA16(04),FNCT3(03),FUNCT2(02),FNCT1(01)
002050  032777  000002  176746          BIT     #BIT1,@DRST     ;TEST FNCT1
002056  001001                          BNE     .+4             ;IS IT SET?
002060  104000                          HLT                     ;FNCT1 IS CLEAR
002062  032777  000004  176734          BIT     #BIT2,@DRST     ;TEST FNCT2
002070  001001                          BNE     .+4             ;IS IT SET?
002072  104000                          HLT                     ;FNCT2 IS CLEAR
002074  032777  000010  176722          BIT     #BIT3,@DRST     ;TEST FNCT3
002102  001001                          BNE     .+4             ;IS IT SET?
002104  104000                          HLT                     ;FNCT3 IS CLEAR
002106  032777  000020  176710          BIT     #BIT4,@DRST     ;TEST XBA16
002114  001001                          BNE     .+4             ;IS IT SET?
```

```
                                                ;TEST XBA17
    784  002120  032777  000040  176676        BIT     #BIT5,@DRST
    785  002126  001001                        BNE     .+4             ;IS IT SET?
    786  002130  104000                        HLT                     ;XBA17 IS CLEAR
    787  002132  032777  000100  176664        BIT     #BIT6,@DRST     ;TEST IE
    788  002140  001001                        BNE     .+4             ;IS IT SET?
    789  002142  104000                        HLT                     ;IE IS CLEAR
    790  002144  032777  000400  176652        BIT     #BIT8,@DRST     ;TEST CYCLE
    791  002152  001001                        BNE     .+4             ;IS CYCLE SET?
    792  002154  104000                        HLT                     ;CYCLE IS CLEAR
    793  002156  032777  010000  176640        BIT     #BIT12,@DRST    ;TEST MAINT
    794  002164  001001                        BNE     .+4             ;IS MAINT SET?
    795  002166  104000                        HLT                     ;MAINT IS CLEAR
    796  002170  042777  010576  176626        BIC     #10576,@DRST    ;CLEAR ALL R/W BITS IN DRST
    797  002176  032777  000002  176620        BIT     #BIT1,@DRST     ;TEST FNCT1
    798  002204  001401                        BEQ     .+4             ;IS FNCT1 CLEAR?
    799  002206  104000                        HLT                     ;FNCT1 IS SET
    800  002210  032777  000004  176606        BIT     #BIT2,@DRST     ;TEST FNCT2
    801  002216  001401                        BEQ     .+4             ;IS FNCT2 CLEAR?
    802  002220  104000                        HLT                     ;FNCT2 IS SET
    803  002222  032777  000010  176574        BIT     #BIT3,@DRST     ;TEST FNCT3
    804  002230  001401                        BEQ     .+4             ;IS FNCT3 CLEAR?
    805  002232  104000                        HLT                     ;FNCT3 IS SET
    806  002234  032777  000020  176562        BIT     #BIT4,@DRST     ;TEST XBA16
    807  002242  001401                        BEQ     .+4             ;IS XBA16 CLEAR
    808  002244  104000                        HLT                     ;XBA16 IS SET
    809  002246  032777  000040  176550        BIT     #BIT5,@DRST     ;TEST XBA17
    810  002254  001401                        BEQ     .+4             ;IS XBA17 CLEAR?
    811  002256  104000                        HLT                     ;XBA17 IS SET
    812
    813  002260  032777  000100  176536        BIT     #BIT6,@DRST     ;TEST IE
    814  002266  001401                        BEQ     .+4             ;IS IE CLEAR?
    815  002270  104000                        HLT                     ;IE IS SET
    816  002272  032777  000400  176524        BIT     #BIT8,@DRST     ;TEST CYCLE
    817  002300  001401                        BEQ     .+4             ;IS CYCLE CLEAR?
    818  002302  104000                        HLT                     ;CYCLE IS SET
    819  002304  032777  010000  176512        BIT     #BIT12,@DRST    ;TEST MAINT
    820  002312  001401                        BEQ     .+4             ;IS MAINT CLEAR?
    821  002314  104000                        HLT                     ;MAINT IS SET
    822
    823                          ;;*****************************************************************
    824                          ;       TEST17 ALL R/W BITS IN DRST CAN BE SET AND RESET TO ZERO, THAT READY
    825                          ;       IS SET, NEX IS CLEAR, AND GO IS READ AS A 0.
    826                          ;;*****************************************************************
    827  002316  104400                        SCOPE
    828  002320  012767  000010  007714        MOV     #10,ICOUNT
    829  002326  052777  010576  176470        BIS     #10576,@DRST    ;SET FOLLOWING: MAINT(12),CYCLE(08),IE(06),XBA17(05),
    830                                                                  ;               XBA16(04),FNCT3(03),FNCT2(02),FNCT1(01)
    831  002334  017701  176464                MOV     @DRST,%1        ;MOVE (DRST) TO R1
    832  002340  052701  167201                BIS     #167201,%1      ;SETS BITS IN R1 THAT WERE NOT SET IN DRST
    833  002344  005201                        INC     %1              ;R1 SHOULD GO FROM -1 TO ZERO
    834  002346  001401                        BEQ     .+4             ;WERE ALL DRST R/W BITS SET?
    835  002350  104000                        HLT                     ;NOT ALL BITS WERE SET
    836  002352  004767  007706                JSR     %7,CKSWR
    837  002356  000005                        RESET                   ;CLEAR ALL DRST R/W BITS
    838  002360  017701  176440                MOV     @DRST,%1        ;MOVE (DRST) TO R1
```

```
                                        BEQ     .+4             ;SHOULD EQUAL ZERO
                                        HLT                     ;RESET DIDN'T LEAVE DRST AS IT SHOULD HAVE

                                ;;******************************************************************
                                ;       TEST20 CAN DRWC HOLD ALTERNATE ONE'S AND ZERO'S
                                ;;******************************************************************
                                        SCOPE
                                        MOV     #4000,ICOUNT
                                        MOV     #052525,@DRWC   ;ALT 0'S AND 1'S TO DRWC
                                        CMP     #052525,@DRWC   ;LOOKING FOR Z-BIT TO SET
                                        BEQ     .+4             ;DOES DRWC HAVE THE CORRECT PATTERN?
                                        HLT                     ;DRWC DOESN'T HAVE THE CORRECT PATTERN
                                        MOV     #125252,@DRWC   ;ALT 1'S AND 0'S TO DRWC
                                        CMP     #125252,@DRWC   ;LOOKING FOR Z-BIT TO SET
                                        BEQ     .+4             ;DOES DRWC HAVE THE CORRECT PATTERN?
                                        HLT                     ;DRWC DOESN'T HAVE THE CORRECT PATTERN

                                ;;******************************************************************
                                ;       TEST21 CAN DRBA HOLD ALTERNATE ONE'S AND ZERO'S
                                ;;******************************************************************
                                        SCOPE
                                        MOV     #052524,@DRBA   ;ALT 0'S AND 1'S TO DRBA
                                        CMP     #052524,@DRBA   ;LOOKING FOR Z-BIT TO SET
                                        BEQ     .+4             ;DOES DRBA HAVE THE CORRECT PATTERN?
                                        HLT                     ;DRBA DOESN'T HAVE THE CORRECT PATTERN
                                        MOV     #125252,@DRBA   ;ALT 1'S AND 0'S TO DRBA
                                        CMP     #125252,@DRBA   ;LOOKING FOR Z-BIT TO SET
                                        BEQ     .+4             ;DOES DRBA HAVE THE CORRECT PATTERN?
                                        HLT                     ;DRBA DOESN'T HAVE THE CORRECT PATTERN

                                ;;******************************************************************
                                ;       TEST22 INCREMENTING PATTERN TO WRAP-AROUND IN DRWC
                                ;;******************************************************************
                                        SCOPE
                                        CLR     ICOUNT
                                        CLR     %1              ;SET-UP
                                        CLR     @DRWC           ;SET-UP
                                INCWC:  CMP     %1,@DRWC        ;SEE IF THEY ARE EQUAL
                                        BEQ     .+4             ;ARE THEY EQUAL?
                                        HLT                     ;THEY'RE NOT EQUAL
                                        INC     @DRWC           ;GET NEXT NUMBER
                                        INC     %1              ;GET NEXT NUMBER
                                        BNE     INCWC           ;DONE WITH TEST?  IF NOT CONTINUE

                                ;;******************************************************************
                                ;       TEST23 INCREMENTING PATTERN TO WRAP-AROUND IN DRBA
                                ;;******************************************************************
                                        SCOPE
                                        CLR     %1              ;SET-UP
                                        CLR     @DRBA           ;SET-UP
                                INCBA:  CMP     %1,@DRBA        ;SEE IF THEY ARE EQUAL
                                        BEQ     .+4             ;ARE THEY EQUAL?
                                        HLT                     ;THEY'RE NOT EQUAL
                                        ADD     #2,@DRBA        ;GET NEXT NUMBER
                                        ADD     #2,%1           ;GET NEXT NUMBER
```

```
                                ;;*****************************************************************
                                ;       TEST25 TEST THAT DR11-B DOES NOT INTERRUPT WITH PROC AT LEVEL 7
                                ;;*****************************************************************
002576  104400                          SCOPE
002600  012767  004000  007434          MOV     #4000,ICOUNT
002606  012777  000340  176202          MOV     #340,@PSW       ;STATUS AT LEVEL 7
002614  032777  000200  176202          BIT     #BIT7,@DRST     ;CHECK READY BIT
002622  001010                          BNE     P7INV           ;IS IT SET
002624  004767  007434                  JSR     %7,CKSWR
002630  000005                          RESET                   ;INIT TO SET READY
002632  032777  000200  176164          BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
002640  001001                          BNE     .+4             ;IS READY SET?
002642  104000                          HLT                     ;READY CAN'T BE SET BY INIT
002644  012777  002700  176162  P7INV:  MOV     #P7ERR,@DRINV   ;SET UP INT VECTOR
002652  012737  000340  000126          MOV     #340,@#126
002660  052777  000100  176136          BIS     #BIT6,@DRST     ;SET IE
002666  000240                          NOP
002670  042777  000100  176126          BIC     #BIT6,@DRST     ;DR11-B DIDN'T INTERRUPT - CLEAR IE
002676  000405                          BR      X1
002700  022626                  P7ERR:  CMP     (%6)+,(%6)+     ;RESTORE STACK
002702  042777  000100  176114          BIC     #BIT6,@DRST     ;CLEAR IE
002710  104000                          HLT                     ;DR11-B INTERRUPTED, BUT IT SHOULDN'T HAVE

                                ;;*****************************************************************
                                ;       TEST26 TEST THAT DR11-B DOES NOT INTERRUPT WITH PROC AT LEVEL 6
                                ;;*****************************************************************
002712  104400                  X1:     SCOPE
002714  012777  000300  176074          MOV     #300,@PSW       ;STATUS AT LEVEL 6
002722  032777  000200  176074          BIT     #BIT7,@DRST     ;CHECK READY BIT
002730  001010                          BNE     P6INV           ;IS IT SET?
002732  004767  007326                  JSR     %7,CKSWR
002736  000005                          RESET                   ;INIT TO SET READY
002740  032777  000200  176056          BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
002746  001001                          BNE     .+4             ;IS READY SET?
002750  104000                          HLT                     ;READY CAN'T BE SET BY INIT
002752  012777  003006  176054  P6INV:  MOV     #P6ERR,@DRINV   ;SET UP INT VECTOR
002760  012737  000340  000126          MOV     #340,@#126
002766  052777  000100  176030          BIS     #BIT6,@DRST     ;SET IE
002774  000240                          NOP
002776  042777  000100  176020          BIC     #BIT6,@DRST     ;DR11-B DIDN'T INTERRUPT - CLEAR IE
003004  000405                          BR      X2
003006  022626                  P6ERR:  CMP     (%6)+,(%6)+     ;RESTORE STACK
003010  042777  000100  176006          BIC     #BIT6,@DRST     ;CLEAR IE
003016  104000                          HLT                     ;DR11-B INTERRUPTED, BUT IT SHOULDN'T HAVE


                                ;;*****************************************************************
                                ;       TEST27 TEST THE DR11-B INTERRUPT WITH PROC AT LEVEL 5
                                ;;*****************************************************************
003020  104400                  X2:     SCOPE
003022  012777  000240  175766          MOV     #240,@PSW       ;STATUS AT LEVEL 5
003030  032777  000200  175766          BIT     #BIT7,@DRST     ;CHECK READY BIT
003036  001010                          BNE     P5INV           ;IS IT SET?
```

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                                        RESET                   ;INIT TO SET READY
003044  000005
003046  032777  000200  175750          BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
003054  001001                          BNE     .+4             ;IS IT SET?
003056  104000                          HLT                     ;RDY CAN'T BE SET BY INIT
003060  017767  175730  176010  P5INV:  MOV     @SR,TEMP        ;GET SWITCH SETTINGS
003066  042767  177770  176002          BIC     #177770,TEMP    ;ISOLATE BR LEVEL
003074  012777  003142  175732          MOV     #P5ERR,@DRINV   ;SET UP INT VECTOR
003102  012737  000340  000126          MOV     #340,@#126
003110  052777  000100  175706          BIS     #BIT6,@DRST     ;SET IE
003116  000240                          NOP
003120  042777  000100  175676          BIC     #BIT6,@DRST     ;DR11-B DIDN'T INTERRUPT - CLEAR IE
003126  022767  000006  175742          CMP     #6,TEMP         ;BR LEVEL = 6 ?
003134  001001                          BNE     1$              ;NO, EVERYTHING IS OK
003136  104000                          HLT                     ;DR11-B WITH BR = 6 SHOULD HAVE INTERRUPTED
003140  000411                  1$:     BR      X3
003142  022626          P5ERR:  CMP     (%6)+,(%6)+     ;RESTORE STACK
003144  042777  000100  175652          BIC     #BIT6,@DRST     ;CLEAR IE
003152  022767  000006  175716          CMP     #6,TEMP         ;BR LEVEL = 6 ?
003160  001401                          BEQ     X3              ;YES, EVERYTHING IS OK
003162  104000                          HLT                     ;DR11-B WITH BR NOT = 6 SHOULD NOT HAVE INTERRUPTED

                        ;;**********************************************************************
                        ;       TEST30 TEST THE DR11-B INTERRUPT WITH PROC AT LEVEL 4
                        ;;**********************************************************************
003164  104400          X3:     SCOPE
003166  012777  000200  175622          MOV     #200,@PSW       ;STATUS AT LEVEL 4
003174  032777  000200  175622          BIT     #BIT7,@DRST     ;CHECK READY BIT
003202  001010                          BNE     P4INV           ;IS IT SET?
003204  004767  007054                  JSR     %7,CKSWR
003210  000005                          RESET                   ;INIT TO SET READY
003212  032777  000200  175604          BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
003220  001001                          BNE     .+4             ;IS IT SET
003222  104000                          HLT                     ;READY CAN'T BE SET BY INIT
003224  017767  175564  175644  P4INV:  MOV     @SR,TEMP        ;GET SWITCH SETTINGS
003232  042767  177770  175636          BIC     #177770,TEMP    ;ISOLATE BR LEVEL
003240  012777  003314  175566          MOV     #P4INT,@DRINV   ;SET UP INT VECTOR
003246  012737  000340  000126          MOV     #340,@#126
003254  052777  000100  175542          BIS     #BIT6,@DRST     ;SET IE
003262  000240                          NOP
003264  005077  175534                  CLR     @DRST           ;CLEAR IE
003270  012777  000126  175536          MOV     #126,@DRINV     ;RESTORE INTERRUPT VECTOR
003276  022767  000004  175572          CMP     #4,TEMP         ;BR LEVEL = 4 ?
003304  001401                          BEQ     1$              ;YES, EVERYTHING IS OK
003306  104000                          HLT                     ;DR11-B DIDN'T INTERRUPT
003310  000167  000026                  JMP     X4
003314  005077  175504          P4INT:  CLR     @DRST           ;CLEAR IE
003320  022626                  1$:     CMP     (%6)+,(%6)+     ;REPOSITION THE STACK AFTER AN INTERRUPT
003322  012777  000126  175504          MOV     #126,@DRINV     ;RESTORE INTERRUPT VECTOR
003330  022767  000004  175540          CMP     #4,TEMP         ;BR LEVEL = 4 ?
003336  001001                          BNE     X4              ;NO, EVERYTHING IS OK
003340  104000                          HLT                     ;DR11-B WITH BR = 4 SHOULD NOT HAVE INTERRUPTED


                        ;;**********************************************************************
                        ;       TEST30A TEST THAT DR11-B DOES INTERRUPT WITH PROC AT LEVEL 3
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1008  003342  104400                X4:     SCOPE
1009  003344  012777  000140  175444        MOV     #140,@PSW       ;STATUS AT LEVEL 3
1010  003352  032777  000200  175444        BIT     #BIT7,@DRST     ;CHECK READY BIT
1011  003360  001010                        BNE     P3INV           ;IS IT SET?
1012  003362  004767  006676                JSR     %7,CKSWR
1013  003366  000005                        RESET                   ;INIT TO SET READY
1014  003370  032777  000200  175426        BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
1015  003376  001001                        BNE     .+4             ;IS IT SET
1016  003400  104000                        HLT                     ;READY CAN'T BE SET BY INIT
1017  003402  012777  003452  175424  P3INV: MOV     #P3INT,@DRINV   ;SET UP INT VECTOR
1018  003410  012737  000340  000126        MOV     #340,@#126
1019  003416  052777  000100  175400        BIS     #BIT6,@DRST     ;SET IE
1020  003424  000240                        NOP
1021  003426  005077  175372                CLR     @DRST           ;CLEAR IE
1022  003432  012777  000126  175374        MOV     #126,@DRINV     ;RESTORE INTERRUPT VECTOR
1023  003440  005037  000126                CLR     @#126           ;RESTORE TRAP CATCHER
1024  003444  104000                        HLT                     ;DR11-B DIDN'T INTERRUPT
1025  003446  000167  000020                JMP     X5
1026  003452  005077  175346  P3INT: CLR     @DRST           ;CLEAR IE
1027  003456  022626                        CMP     (%6)+,(%6)+     ;REPOSITION THE STACK AFTER AN INTERRUPT
1028  003460  012777  000126  175346        MOV     #126,@DRINV     ;RESTORE INTERRUPT VECTOR
1029  003466  005037  000126                CLR     @#126           ;RESTORE TRAP CATCHER
1030
1031
1032                                  ;;*****************************************************************
1033                                  ;       TEST31 TEST THAT FNCT BITS CONTROL DSTAT BITS (M968 MUST BE USED IN USER SLOTS)
1034                                  ;;*****************************************************************
1035  003472  104400                X5:     SCOPE
1036  003474  005077  175324                CLR     @DRST           ;CLEAR FUNCTION BITS
1037  003500  032777  000016  175316        BIT     #16,@DRST       ;CHECK FUNCTION BITS
1038  003506  001401                        BEQ     .+4             ;FUNCTION BITS CLEAR?
1039  003510  104000                        HLT                     ;FUNCTION BITS NOT CLEAR
1040  003512  052777  000002  175304        BIS     #BIT1,@DRST     ;SET FNCT1
1041  003520  032777  001000  175276        BIT     #BIT9,@DRST     ;CHECK DSTAT C
1042  003526  001001                        BNE     .+4             ;IS IT SET?
1043  003530  104000                        HLT                     ;DSTAT C IS CLEAR
1044  003532  032777  006000  175264        BIT     #6000,@DRST     ;CHECK THAT DSTAT A AND DSTAT B ARE CLEAR
1045  003540  001401                        BEQ     .+4             ;ARE THEY CLEAR?
1046  003542  104000                        HLT                     ;DSTAT A AND/OR DSTAT B IS SET
1047  003544  005077  175254                CLR     @DRST           ;CLEAR DRST
1048  003550  052777  000004  175246        BIS     #BIT2,@DRST     ;SET FNCT2
1049  003556  032777  002000  175240        BIT     #BIT10,@DRST    ;CHECK DSTAT B
1050  003564  001001                        BNE     .+4             ;IS IT SET?
1051  003566  104000                        HLT                     ;DSTAT B IS CLEAR
1052  003570  032777  005000  175226        BIT     #5000,@DRST     ;CHECK THAT DSTAT A AND DSTAT C ARE CLEAR
1053  003576  001401                        BEQ     .+4             ;ARE THEY CLEAR?
1054  003600  104000                        HLT                     ;DSTAT A AND/OR DSTAT B IS SET
1055  003602  005077  175216                CLR     @DRST           ;CLEAR DRST
1056  003606  052777  000010  175210        BIS     #BIT3,@DRST     ;SET FNCT3
1057  003614  032777  004000  175202        BIT     #BIT11,@DRST    ;CHECK DSTAT A
1058  003622  001001                        BNE     .+4             ;IS IT SET?
1059  003624  104000                        HLT                     ;DSTAT A IS CLEAR
1060  003626  032777  003000  175170        BIT     #3000,@DRST     ;CHECK THAT DSTAT B AND DSTAT C ARE CLEAR
1061  003634  001401                        BEQ     .+4             ;ARE THEY CLEAR?
1062  003636  104000                        HLT                     ;DSTAT B AND/OR DSTAT C IS SET
```

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1064                                    ;;*****************************************************************
1065                                    ;       TEST 33 TEST FOR 1 DATI NPR TRANSFER (WITH M968 IN USER SLOTS)
1066                                    ;;*****************************************************************
1067   003644  104400                           SCOPE
1068   003646  005777  175152          TNPR1:  TST     @DRST           ;CHECK ERROR BIT
1069   003652  100027                          BPL     NPRRDY          ;IS IT CLEAR?
1070   003654  032777  020000  175142          BIT     #BIT13,@DRST    ;CHECK ATTN
1071   003662  001401                          BEQ     .+4             ;IS ATTN CLEAR
1072   003664  104000                          HLT                     ;ATTN IS SET
1073   003666  032777  040000  175130          BIT     #BIT14,@DRST    ;CHECK NEX
1074   003674  001410                          BEQ     N1413           ;IS NEX CLEAR?
1075   003676  042777  040000  175120          BIC     #BIT14,@DRST    ;TRY TO CLEAR NEX
1076   003704  032777  040000  175112          BIT     #BIT14,@DRST    ;CHECK AGAIN
1077   003712  001401                          BEQ     .+4             ;NEX STILL SET
1078   003714  104000                          HLT                     ;NEX CAN'T BE CLEARED BY MOVING A 0 TO IT
1079   003716  005077  175100          N1413:  CLR     @DRBA           ;TRY TO CLEAR BAOF
1080   003722  005777  175076                  TST     @DRST           ;CHECK ERROR BIT AGAIN
1081   003726  001401                          BEQ     .+4             ;IS IT CLEAR
1082   003730  104000                          HLT                     ;ERROR CAUSED BY SOMETHING OTHER THAN NEX,ATTN, OR BAOF
1083   003732  012777  177777  175060  NPRRDY: MOV     #-1,@DRWC       ;SET UP FOR 1 TRANSFER
1084   003740  012777  001036  175054          MOV     #NPR1,@DRBA     ;TRANSFER FROM BUS ADDRESS IN NPR1
1085   003746  005077  175054                  CLR     @DRDB           ;GET READY TO RECEIVE DATA
1086   003752  012767  052525  175056          MOV     #52525,NPR1     ;SET UP TRANSFER DATA
1087   003760  012777  004024  175046          MOV     #INTB,@DRINV    ;INTERRUPT VECTOR TO INTB
1088   003766  012777  000005  175034          MOV     #5,@DRVS        ;INTERRUPT PRIORITY TO LEVEL 5
1089   003774  005077  175016                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1090   004000  012777  000101  175016          MOV     #101,@DRST      ;IE AND DO TO DRST
1091   004006  005067  000002                  CLR     1$+2            ;WAIT FOR NPR AND INTERRUPT
1092   004012  005227  000001          1$:     INC     #1
1093   004016  001375                          BNE     1$
1094   004020  104000                          HLT                     ;NO DR11-B INTERRUPT
1095   004022  000424                          BR      T33CLR          ;CLEAR IE
1096   004024  004767  003204          INTB:   JSR     %7,ERRCHK
1097   004030  005777  174764                  TST     @DRWC           ;TEST DRWC
1098   004034  001401                          BEQ     .+4             ;IS DRWC EQUAL TO ZERO?
1099   004036  104000                          HLT                     ;DRWC NOT EQUAL TO ZERO
1100   004040  022777  001040  174754          CMP     #NPR1+2,@DRBA   ;COMPARE CORRECT DRBA WITH DRBA
1101   004046  001401                          BEQ     .+4             ;IS THE DRBA CORRECT?
1102   004050  104000                          HLT                     ;DRBA IS WRONG
1103   004052  022777  052525  174746          CMP     #52525,@DRDB    ;CHECK FOR CORRECT DATA
1104   004060  001401                          BEQ     .+4             ;DATA GET TRANSFERRED?
1105   004062  104000                          HLT                     ;BAD DATA IN DRDB
1106   004064  004767  003054                  JSR     %7,NORMAL
1107   004070  022626                          CMP     (%6)+,(%6)+     ;RESTORE STACK
1108   004072  000403                          BR      TNPRO           ;GO TO NEXT TEST (NPR OUT)
1109   004074  005077  174724          T33CLR: CLR     @DRST           ;CLEAR IE
1110   004100  000662                          BR      TNPR1           ;TRY TEST AGAIN
1111                                    ;;*****************************************************************
1112                                    ;       TEST 34 TEST FOR 1 DATO NPR TRANSFER (WITH M968 IN USER SLOTS)
1113                                    ;;*****************************************************************
1114   004102  104400                  TNPRO:  SCOPE
1115   004104  012777  177777  174706          MOV     #-1,@DRWC       ;SET UP FOR 1 TRANSFER
1116   004112  012777  001036  174702          MOV     #NPR1,@DRBA     ;TRANSFER TO BUS ADDRESS IN NPR1
1117   004120  005067  174712                  CLR     NPR1            ;GET READY TO RECEIVE DATA
1118   004124  012777  052525  174674          MOV     #52525,@DRDB    ;SET UP TO TRANSFER DATA
```

```
1120  004140  016777  174666  174662          MOV     DRINL,@DRVS     ;INTERRUPT STATUS TO LEVEL DRINL
1121  004146  005077  174644                  CLR     @PSW            ;PROC STATUS TO ZERO
1122  004152  012777  000103  174644          MOV     #103,@DRST      ;IE, FNCT1(C1 CONTROL), AND DO TO DRST
1123  004160  005067  000002                  CLR     1$+2            ;WAIT FOR NPR AND INTER
1124  004164  005227  000001          1$:     INC     #1
1125  004170  001375                          BNE     1$
1126  004172  104000                          HLT                     ;NO DR11-B INTERRUPT
1127  004174  000424                          BR      T34CLR          ;CLEAR IE
1128  004176  004767  003032          INTC:   JSR     %7,ERRCHK
1129  004202  005777  174612                  TST     @DRWC           ;TEST DRWC
1130  004206  001401                          BEQ     .+4             ;IS DRWC EQUAL TO ZERO?
1131  004210  104000                          HLT                     ;DRWC EQUAL TO ZERO
1132  004212  022777  001040  174602          CMP     #NPR1+2,@DRBA   ;COMPARE CORRECT DRBA WITH DRBA
1133  004220  001401                          BEQ     .+4             ;IS THE DRBA CORRECT?
1134  004222  104000                          HLT                     ;DRBA IS WRONG
1135
1136  004224  026727  174606  052525          CMP     NPR1,#52525     ;CHECK FOR CORRECT DATA
1137  004232  001401                          BEQ     .+4             ;CORRECT DATA TRANSFERRED?
1138  004234  104000                          HLT                     ;BAD DATA
1139  004236  004767  002702                  JSR     %7,NORMAL
1140  004242  022626                          CMP     (%6)+,(%6)+     ;RESTORE STACK
1141  004244  000403                          BR      T35             ;GO TO NEXT TEST
1142  004246  005077  174552          T34CLR: CLR     @DRST           ;CLEAR IE
1143  004252  000713                          BR      TNPRO           ;TRY TEST AGAIN
1144
1145                                  ;;**********************************************************************
1146                                  ;       TEST 35 STRING OF 10 DATI'S (WITH M968 IN USER SLOTS)
1147                                  ;;**********************************************************************
1148  004254  104400                  T35:    SCOPE
1149  004256  012767  000020  174562          MOV     #20,BUFLEN      ;LENGTH OF BUFFER=20
1150  004264  004767  002416                  JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1151  004270  006267  174552                  ASR     BUFLEN          ;BUFLEN=10
1152  004274  016767  174546  174552          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1153  004302  005467  174546                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1154  004306  016777  174542  174504          MOV     WCLEN,@DRWC     ;SET UP DRWC
1155  004314  016777  174522  174500          MOV     INBUF,@DRBA     ;SET UP DRBA
1156  004322  012777  177777  174476          MOV     #-1,@DRDB       ;MAINT AIDE
1157  004330  012777  007010  174476          MOV     #INTA,@DRINV    ;INT VECTOR TO INTA
1158  004336  016777  174470  174464          MOV     DRINL,@DRVS     ;INT VECTOR TO PRIORITY DRINL
1159  004344  005077  174446                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1160  004350  012777  000101  174446          MOV     #101,@DRST      ;IE AND DO TO DRST
1161  004356  000777                          BR      .               ;WAIT FOR INTERRUPT
1162  004360  022777  000007  174440          CMP     #7,@DRDB        ;CHECK THAT WORD #10 OF INBUF IS IN DRBA
1163  004366  001401                          BEQ     .+4             ;IS IT?
1164  004370  104000                          HLT                     ;BAD DATA IN DRDB
1165
1166                                  ;;**********************************************************************
1167                                  ;       TEST 36 STRING OF 10 DATO'S (WITH M968 IN USER SLOTS)
1168                                  ;;**********************************************************************
1169  004372  104400                          SCOPE
1170  004374  012767  000020  174444          MOV     #20,BUFLEN      ;LENGTH OF BUFFER=20
1171  004402  004767  002300                  JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1172  004406  006267  174434                  ASR     BUFLEN          ;BUFLEN=10
1173  004412  016767  174430  174434          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1174  004420  005467  174430                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
```

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1176   004432  016777  174404  174362          MOV     INBUF,@DRBA     ;SET UP DRBA
1177   004440  012777  052525  174360          MOV     #52525,@DRDB    ;SET UP DRDB
1178   004446  012777  007010  174360          MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
1179   004454  016777  174352  174346          MOV     DRINL,@DRVS     ;INTERRUPT VECTOR TO PRIORITY DRINL
1180   004462  005077  174330                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1181   004466  012777  000103  174330          MOV     #103,@DRST      ;IE, FNCT1(C1 CONTROL), AND DO TO DRST
1182   004474  000777                          BR      .               ;WAIT FOR INTERRUPT
1183   004476  004767  002464                  JSR     %7,DATOCK       ;CHECK INBUF
1184
1185                                  ;;*****************************************************************
1186                                  ;       TEST 37 STRING OF 200 DATI'S
1187                                  ;;*****************************************************************
1188   004502  104400                  SCOPE
1189   004504  012767  000200  174334          MOV     #200,BUFLEN     ;LENGTH OF BUFFER=200
1190   004512  004767  002170                  JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1191   004516  016767  174324  174330          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1192   004524  005467  174324                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1193   004530  016777  174320  174262          MOV     WCLEN,@DRWC     ;SET UP DRWC
1194   004536  016777  174300  174256          MOV     INBUF,@DRBA     ;SET UP DRBA
1195   004544  012777  177777  174254          MOV     #-1,@DRDB       ;MAINT AIDE
1196   004552  012777  007010  174254          MOV     #INTA,@DRINV    ;INT VECTOR TO INTA
1197   004560  016777  174246  174242          MOV     DRINL,@DRVS     ;INT VECTOR TO PRIORITY DRINL
1198   004566  005077  174224                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1199   004572  012777  000101  174224          MOV     #101,@DRST      ;IE AND DO TO DRST
1200   004600  000777                          BR      .               ;WAIT FOR INTERRUPT
1201   004602  022777  000177  174216          CMP     #177,@DRDB      ;CHECK THAT WORD #200 OF INBUF IS IN DRBA
1202   004610  001401                          BEQ     .+4             ;IS IT?
1203   004612  104000                          HLT                     ;BAD DATA IN DRDB
1204                                  ;;*****************************************************************
1205                                  ;       TEST 40 STRING OR 200 DATO'S
1206                                  ;;*****************************************************************
1207   004614  104400                  SCOPE
1208   004616  012767  000201  174222          MOV     #201,BUFLEN     ;LENGTH OF BUFFER=201
1209   004624  004767  002056                  JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1210   004630  005367  174212                  DEC     BUFLEN          ;BUFLEN=200
1211   004634  016767  174206  174212          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1212   004642  005467  174206                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1213   004646  016777  174202  174144          MOV     WCLEN,@DRWC     ;SET UP DRWC
1214   004654  016777  174162  174140          MOV     INBUF,@DRBA     ;SET UP DRBA
1215   004662  012777  052525  174136          MOV     #52525,@DRDB    ;SET UP DRDB
1216   004670  012777  007010  174136          MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
1217   004676  016777  174130  174124          MOV     DRINL,@DRVS     ;INTERRUPT VECTOR TO PRIORITY DRINL
1218   004704  005077  174106                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1219   004710  012777  000103  174106          MOV     #103,@DRST      ;IE, FNCT1, AND DO TO DRST
1220   004716  000777                          BR      .               ;WAIT FOR INTERRUPT
1221   004720  004767  002242                  JSR     %7,DATOCK       ;CHECK INBUF
1222
1223                                  ;;*****************************************************************
1224                                  ;       TEST 42 TEST THAT DOING A DATO TO THE DIODE MEMORY CAUSES NEX
1225                                  ;;*****************************************************************
1226   004724  104400                  SCOPE
1227   004726  012777  177776  174064          MOV     #-2,@DRWC       ;SET UP DRWC
1228   004734  016777  174100  174060          MOV     DIOMEM,@DRBA    ;SET UP DRBA
1229   004742  012777  004776  174064          MOV     #NEXCHK,@DRINV  ;INTERRUPT VECTOR TO NEXCHK
1230   004750  016777  174056  174052          MOV     DRINL,@DRVS     ;INTERRUPT STATUS TO LEVEL DRINL
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1232  004762  012777  000163  174034          MOV     #163,@DRST      ;IE, FNCT1, XBA17, XBA16, AND GO TO DRST
1233  004770  005237  177560                  INC     @#177560        ;WAIT FOR INTERRUPT
1234  004774  104000                          HLT                     ;NO DR11-B INTERRUPT
1235  004776  042777  000100  174020  NEXCHK: BIC     #BIT6,@DRST     ;CLEAR  INTERRUPT  ENABLE
1236  005004  005777  174014                  TST     @DRST           ;TEST DRST
1237  005010  001001                          BNE     .+4             ;ERROR SET?
1238  005012  104000                          HLT                     ;ERROR NOT SET
1239  005014  105777  174004                  TSTB    @DRST           ;TEST FOR READY
1240  005020  001001                          BNE     .+4             ;READY SET?
1241  005022  104000                          HLT                     ;READY ISN'T SET
1242  005024  032777  040000  173772          BIT     #BIT14,@DRST    ;CHECK NEX
1243  005032  001001                          BNE     .+4             ;NEX SET?
1244  005034  104000                          HLT                     ;NEX IS CLEAR
1245  005036  042777  040000  173760          BIC     #BIT14,@DRST    ;CLEAR NEX
1246  005044  022626                          CMP     (%6)+,(%6)+     ;RESTORE THE STACK
1247  005046  004767  002072                  JSR     %7,NORMAL
1248
1249                                  ;;**************************************************************
1250                                  ;       TEST 43 TEST THAT CROSSING A 32K BOUNDRY DOES NOT CAUSE
1251                                  ;       A BAOF AND DOES NOT FORCE AN ERROR
1252                                  ;;**************************************************************
1253  005052  104400                          SCOPE
1254  005054  012767  000010  005160          MOV     #10,ICOUNT
1255  005062  012777  177760  173730          MOV     #-20,@DRWC      ;SET UP DRWC
1256  005070  012777  177776  173724          MOV     #-2,@DRBA       ;SET UP DRBA FOR PROC STATUS ADDRESS
1257  005076  012777  005132  173730          MOV     #BAOFCK,@DRINV  ;INTERRUPT VECTOR TO BAOFCK
1258  005104  016777  173722  173716          MOV     DRINL,@DRVS     ;INTERRUPT STATUS TO LEVEL DRINL
1259  005112  005077  173700                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1260  005116  012777  000163  173700          MOV     #163,@DRST      ;IE, FNCT1, XBA17, XBA16, AND GO TO DRST
1261  005124  005237  177560                  INC     @#177560        ;WAIT FOR INTERRUPT
1262  005130  104000                          HLT                     ;NO DR11-B INTERRUPT
1263  005132  042777  000100  173664  BAOFCK: BIC     #BIT6,@DRST     ;CLEAR INTERRUPT  ENABLE
1264  005140  022626                          CMP     (%6)+,(%6)+     ;RESTORE THE STACK
1265  005142  005777  173656                  TST     @DRST           ;TEST DRST
1266  005146  100401                          BMI     .+4             ;ERROR SET?
1267  005150  104000                          HLT                     ;ERROR NOT SET
1268  005152  105777  173646                  TSTB    @DRST           ;TEST FOR READY
1269  005156  100401                          BMI     .+4             ;READY SET?
1270  005160  104000                          HLT                     ;READY ISN'T SET
1271  005162  042777  040000  173634          BIC     #BIT14,@DRST    ;CLEAR NEX
1272  005170  032777  060000  173626          BIT     #60000,@DRST    ;CHECK NEX AND ATTN
1273  005176  001401                          BEQ     .+4             ;ARE THEY CLEAR?
1274  005200  104000                          HLT                     ;NEX AND/OR ATTN IS SET
1275  005202  005777  173616                  TST     @DRST           ;TEST FOR ERROR
1276  005206  100001                          BPL     .+4             ;IS ERROR CLEAR?
1277  005210  104000                          HLT                     ;ERROR IS SET
1278  005212  005077  173604                  CLR     @DRBA           ;CLEAR BUS ADDRESS REGISTER
1279
1280  005216  004767  005042                  JSR     %7,CKSWR
1281  005222  000005                          RESET                   ;INIT
1282  005224  004767  001714                  JSR     %7,NORMAL
1283
1284                                  ;;**************************************************************
1285                                  ;       TEST 44 TEST THAT RESET CLEARS DRDB
1286                                  ;;**************************************************************
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1288  005232  012767  000010  005002          MOV     #10,ICOUNT
1289  005240  012777  177777  173560          MOV     #-1,@DRDB       ;ALL ONES TO DRBA
1290  005246  004767  005012                  JSR     %7,CKSWR
1291  005252  000005                          RESET                   ;INIT
1292  005254  005777  173546                  TST     @DRDB           ;LOOKING FOR Z-BIT TO SET
1293  005260  001401                          BEQ     .+4             ;DID DRDB GET CLEARED?
1294  005262  104000                          HLT                     ;DRDB NOT CLEAR
1295
1296                                  ;;**************************************************************
1297                                  ;       TEST 45 TEST THAT ALL DRDB BITS CAN BE SET
1298                                  ;;**************************************************************
1299  005264  104400                          SCOPE
1300  005266  012767  004000  004746          MOV     #4000,ICOUNT
1301  005274  012777  177777  173524          MOV     #-1,@DRDB       ;SET ALL BITS IN DRDB
1302  005302  022777  177777  173516          CMP     #-1,@DRDB       ;LOOKING FOR Z-BIT TO SET
1303  005310  001401                          BEQ     .+4             ;SEE IF ALL BITS GOT SET
1304  005312  104000                          HLT                     ;ALL DRDB BITS AREN'T SET
1305
1306                                  ;;**************************************************************
1307                                  ;       TEST 46 TEST THAT DRDB CAN HOLD ALTERNATE ONE'S AND ZERO'S
1308                                  ;;**************************************************************
1309  005314  104400                          SCOPE
1310  005316  012777  052525  173502          MOV     #052525,@DRDB   ;ALT 0'S AND 1'S TO DRDB
1311  005324  022777  052525  173474          CMP     #052525,@DRDB   ;LOOKING FOR Z-BIT TO SET
1312  005332  001401                          BEQ     .+4             ;DOES DRDB HAVE THE CORRECT PATTERN?
1313  005334  104000                          HLT                     ;DRDB IS WRONG
1314  005336  012777  125252  173462          MOV     #125252,@DRDB   ;ALT 1'S AND 0'S TO DRDB
1315  005344  022777  125252  173454          CMP     #125252,@DRDB   ;LOOKING FOR Z-BIT TO SET
1316  005352  001401                          BEQ     .+4             ;DOES DRDB HAVE THE CORRECT PATTERN
1317  005354  104000                          HLT                     ;DRDB IS WRONG
1318
1319                                  ;;**************************************************************
1320                                  ;       TEST 47 INCREMENTING PATTERN TO WRAP-AROUND IN DRDB
1321                                  ;;**************************************************************
1322  005356  104400                          SCOPE
1323  005360  005067  004656                  CLR     ICOUNT
1324  005364  005001                          CLR     %1              ;SET-UP
1325  005366  005077  173434                  CLR     @DRDB           ;SET-UP
1326  005372  020177  173430          INCDB:  CMP     %1,@DRDB        ;SEE IF THEY ARE EQUAL
1327  005376  001401                          BEQ     .+4             ;ARE THEY EQUAL?
1328  005400  104000                          HLT                     ;THEY'RE NOT EQUAL
1329  005402  005277  173420                  INC     @DRDB           ;GET NEXT NUMBER
1330  005406  005201                          INC     %1              ;GET NEXT NUMBER
1331  005410  001370                          BNE     INCDB           ;DONE WITH TEST? IF NOT CONTINUE
1332
1333                                  ;;**************************************************************
1334                                  ;       TEST 50 TEST THAT RESET SETS READY AND CLEARS ALL OTHER
1335                                  ;       DRST BITS (WITH M968 INSERTED)
1336                                  ;;**************************************************************
1337  005412  104400                          SCOPE
1338  005414  004767  004644                  JSR     %7,CKSWR
1339  005420  000005                          RESET                   ;INIT
1340  005422  032777  000200  173374          BIT     #BIT7,@DRST     ;CHECK DRST
1341  005430  001001                          BNE     .+4             ;IS READY SET?
1342  005432  104000                          HLT                     ;READY IS CLEAR
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1344  005442  001401                        BEQ     .+4             ;ARE THEY ALL CLEAR?
1345  005444  104000                        HLT                     ;A BIT OTHER THAN READY IS SET IN THE DRST
1346
1347                                  ;;*****************************************************************
1348                                  ;       TEST 51 TEST THAT BAOO READS AS A ZERO WITH MAINT BOARD INSERTED
1349                                  ;;*****************************************************************
1350  005446  104400                        SCOPE
1351  005450  012767  004000  004564        MOV     #4000,ICOUNT
1352  005456  032777  000001  173336        BIT     #BIT0,@DRBA     ;TEST BIT 0 OF DRBA
1353  005464  001401                        BEQ     .+4             ;IS IT CLEAR?
1354  005466  104000                        HLT                     ;BAOO IS SET
1355
1356
1357
1358                                  ;;*****************************************************************
1359                                  ;       TEST 52 TEST THAT GO CLEARS READY
1360                                  ;;*****************************************************************
1361  005470  104400                        SCOPE
1362  005472  012767  004000  004542        MOV     #4000,ICOUNT
1363  005500  012777  177600  173312        MOV     #-200,@DRWC     ;SET-UP DRWC
1364  005506  016777  173330  173306        MOV     INBUF,@DRBA     ;SET-UP DRBA
1365  005514  105777  173304                TSTB    @DRST           ;CHECK READY
1366  005520  100401                        BMI     .+4             ;IS READY SET?
1367  005522  104000                        HLT                     ;READY IS CLEAR
1368  005524  012777  000011  173272        MOV     #11,@DRST       ;FNCT3 (NON-BURST) AND GO TO DRST
1369  005532  105777  173266                TSTB    @DRST           ;CHECK READY
1370  005536  100001                        BPL     .+4             ;IS READY CLEAR?
1371  005540  104000                        HLT                     ;READY IS STILL SET
1372  005542  005067  173310                CLR     RDYCHK          ;CLEAR READY CHECK
1373  005546  105777  173252        TSTRDY: TSTB    @DRST           ;CHECK READY
1374  005552  100406                        BMI     DONE            ;IF SET GO TO DONE
1375  005554  062767  000004  173274        ADD     #4,RDYCHK       ;CHECKING TIME FOR READY TO BE SET
1376  005562  100401                        BMI     .+4             ;IF RDYCHK GETS NEGATIVE IT TOOK TOO LONG
1377  005564  000770                        BR      TSTRDY          ;CHECK AGAIN
1378  005566  104000                        HLT                     ;READY GOT CLEARED BUT NEVER SET AGAIN
1379  005570  000240                DONE:   NOP                     ;GO TO NEXT TEST
1380                                  ;;*****************************************************************
1381                                  ;TEST 55 TEST THAT GIVING A DO WITHOUT CLEARING A PREVIOUS ERROR
1382                                  ;CAUSES ANOTHER INTERRUPT
1383                                  ;FOR THIS TEST, THE NORMAL INTERRUPT MECHANISM SHOULD BE WORKING
1384                                  ;;*****************************************************************
1385  005572  104400                        SCOPE
1386  005574  012777  177760  173216        MOV     #-20,@DRWC      ;SET-UP DRWC
1387  005602  016777  173232  173212        MOV     DIOMEM,@DRBA    ;SET-UP DRBA
1388  005610  012777  005644  173216        MOV     #ERRDO,@DRINV   ;INTERRUPT VECTOR TO ERRDO
1389  005616  012777  000140  173204        MOV     #140,@DRVS      ;INTERRUPT STATUS TO LEVEL 4
1390  005624  005077  173166                CLR     @PSW            ;LET THE DR11-B INTERRUPT
1391  005630  012777  000163  173166        MOV     #163,@DRST      ;IE, XBA17,XBA16,FNCT1 AND GO TO DRST
1392  005636  005277  173216                INC     @TKS            ;WAIT FOR INTERUPT
1393  005642  104000                        HLT                     ;NO DR11-B INTERRUPT
1394  005644  005777  173154        ERRDO:  TST     @DRST           ;TEST DRST
1395  005650  100401                        BMI     .+4             ;ERROR SET?
1396  005652  104000                        HLT                     ;ERROR IS CLEAR - SHOULD HAVE NEX
1397  005654  012777  005726  173152        MOV     #ERRDO1,@DRINV  ;INTERRUPT VECTOR TO ERRDO1
1398  005662  005077  173134                CLR     @DRBA           ;PREVENT CAUSING ANOTHER ERROR
```

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1400  005674  012777  177777  173116          MOV     #-1,@DRWC       ;SET-UP DRWC
1401  005702  005277  173116                  INC     @DRST           ;DO TO DRST
1402  005706  005067  000002                  CLR     1$+2
1403  005712  005227  000001          1$:     INC     #1
1404  005716  001375                          BNE     1$
1405  005720  104000                          HLT                     ;NO DR11-B INTERRUPT
1406  005722  162706  000004                  SUB     #4,%6           ;FAKE AN INTERRUPT WITH STACK
1407  005726  005777  173072          ERRD01: TST     @DRST           ;CHECK ERROR
1408  005732  100401                          BMI     .+4             ;ERROR SET?
1409  005734  104000                          HLT                     ;ERROR IS CLEAR - SHOULD BE SET BECAUSE
1410                                                                  ;PREVIOUS ERROR WAS NOT CLEARED
1411  005736  062706  000010                  ADD     #10,%6          ;REPOSITION THE STACK
1412  005742  004767  001176                  JSR     %7,NORMAL
1413
1414                                  ;;**********************************************************************
1415                                  ;       TEST 56 STRING OF 200 DATI'S NON-BURST MODE
1416                                  ;;**********************************************************************
1417  005746  104400                          SCOPE
1418  005750  012767  000200  173070          MOV     #200,BUFLEN     ;LENGTH OF BUFFER=200
1419  005756  004767  000724                  JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1420  005762  016767  173060  173064          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1421  005770  005467  173060                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1422  005774  016777  173054  173016          MOV     WCLEN,@DRWC     ;SET-UP DRWC
1423  006002  016777  173034  173012          MOV     INBUF,@DRBA     ;SET-UP DRBA
1424  006010  012777  177777  173010          MOV     #-1,@DRDB       ;MAINT AIDE
1425  006016  012777  007010  173010          MOV     #INTA,@DRINV    ;INT VECTOR TO INTA
1426  006024  016777  173002  172776          MOV     DRINL,@DRVS     ;INT VECTOR TO PRIORITY DRINL
1427  006032  005077  172760                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1428  006036  012777  000111  172760          MOV     #111,@DRST      ;IE, FNCT3, AND DO TO DRST
1429  006044  005267  173002                  INC     BRWAIT          ;USE A WAIT OR BR. INSTRUCTION
1430  006050  032767  000001  172774          BIT     #BIT0,BRWAIT    ;SEE WHICH ONE
1431  006056  001403                          BEQ     DATINB          ;BIT 0 CLEAR=BR.
1432  006060  000001                          WAIT                    ;WAIT FOR INTERRUPT
1433  006062  000240                          NOP
1434  006064  000401                          BR      .+4
1435  006066  000777          DATINB: BR      .
1436  006070  022777  000177  172730          CMP     #177,@DRDB      ;CHECK THAT WORD #200 OF INBUF IS IN DRBA
1437  006076  001401                          BEQ     .+4             ;IS IT?
1438  006100  104000                          HLT                     ;BAD DATA IN DRDB
1439
1440                                  ;;**********************************************************************
1441                                  ;       TEST 57 STRING OF 200 DATO'S NON-BURST MODE
1442                                  ;;**********************************************************************
1443  006102  104400                          SCOPE
1444  006104  012767  000201  172734          MOV     #201,BUFLEN     ;LENGTH OF BUFFER=201
1445  006112  004767  000570                  JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1446  006116  005367  172724                  DEC     BUFLEN          ;BUFLEN=200
1447  006122  016767  172720  172724          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1448  006130  005467  172720                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
```

```
1450  006142  016777  172674  172652          MOV     INBUF,@DRBA     ;SET UP DRBA
1451  006150  012777  052525  172650          MOV     #52525,@DRDB    ;SET UP DRDB
1452  006156  012777  007010  172650          MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
1453  006164  016777  172642  172636          MOV     DRINL,@DRVS     ;INTERRUPT VECTOR TO PRIORITY DRINL
1454  006172  005077  172620                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1455  006176  012777  000113  172620          MOV     #113,@DRST      ;IE, FNCT3, FNCT1, AND DO TO DRST
1456  006204  005267  172642                  INC     BRWAIT          ;USE A WAIT OR BR. INSTRUCTION
1457  006210  032767  000001  172634          BIT     #BIT0,BRWAIT    ;BIT 0 CLEAR=BR.
1458  006216  001403                          BEQ     DATONB
```

```
1461   006224   000401                          BR      .+4
1462   006226   000777                DATONB:   BR      .
1463   006230   004767   000732                JSR     %7,DATOCK       ;CHECK INBUF
1464
1465                                  ;;*****************************************************************
1466                                  ;       TEST 60 TEST THAT FUNCTION BITS INCREMENT WITH MAINT MODE TRANSFERS
```

```
1468   006234   104400                      SCOPE
1469   006236   012767   000010   172602    MOV     #10,BUFLEN      ;SET-UP BUFLEN FOR LODBUF AND CHKBUFF
1470   006244   016777   172572   172550    MOV     INBUF,@DRBA     ;SET-UP DRBA
1471   006252   004767   000430             JSR     %7,LODBUF       ;LOAD INBUF
1472   006256   004767   000462             JSR     %7,CHKBFF       ;LOAD CHKBUF
1473   006262   005077   172536             CLR     @DRST           ;INIT FOR STARTING
1474   006266   012767   000001   172574    MOV     #1,FNCCNT       ;GET READY FOR CHECKING
```

```
  1476  006302  016767  172534  172562          MOV     INBUF,INBUF1    ;SAVE INBUF
```

```
1478   006316  016777  172510  172504          MOV     DRINL,@DRVS     ;INTERRUPT VECTOR PRIORITY TO DRINL
1479   006324  005077  172466                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1480   006330  012777  177777  172462          MOV     #-1,@DRWC       ;SET-UP FOR 1 TRANSFER
```

```
1482  006344  000001                          WAIT                    ;WAIT FOR INTERRUPT
1483  006346  000240                          NOP                     ;FAKE-OUT RETURN ADDRESS CHANGING
1484  006350  117701  172450                  MOVB    @DRST,%1        ;LOWER BYTE OF DRST TO R1
1485  006354  042701  000600                  BIC     #600,%1         ;GET RID OF READY AND CYCLE BECAUSE OF MAINT MODE
1486  006360  006201                          ASR     %1              ;MOVE IT RIGHT ONE PLACE
1487  006362  126701  172502                  CMPB    FNCCNT,%1       ;CHECK AGAINST FNCCNT
1488  006366  001401                          BEQ     .+4             ;SHOULD BE EQUAL
1489  006370  104000                          HLT                     ;FUNCTION BITS DIDN'T INCREMENT IN MAINT MODE
1490  006372  005267  172472                  INC     FNCCNT          ;GET READY FOR NEXT PASS
1491  006376  022767  000010  172464          CMP     #10,FNCCNT      ;ONLY 10 BECAUSE FNCT3-1 GO TO ZERO
1492  006404  001404                          BEQ     MFCHK           ;IF ITS EQUAL GO CHECK DATA
1493  006406  062767  000002  172426          ADD     #2,INBUF        ;FAKE-OUT INTA ROUTINE
1494  006414  000735                          BR      MFLOOP          ;DO IT AGAIN
1495  006416  012767  000007  172422  MFCHK:  MOV     #7,BUFLEN       ;SET UP FOR DATCHK (10 FNCT CHECKS, 7 TRANSFERS
1496  006424  016767  172442  172410          MOV     INBUF1,INBUF    ;RESTORE INBUF
1497  006432  004767  000446                  JSR     %7,DATCHK       ;CHECK DATA
1498
1499                                  ;;*****************************************************************
1500                                  ;       TEST 61 TEST FOR 10 MAINT MODE TRANSFERS
1501                                  ;;*****************************************************************
1502  006436  104400                          SCOPE
1503  006440  012767  000010  172400          MOV     #10,BUFLEN      ;BUFLEN=10
1504  006446  016767  172374  172400          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1505  006454  005467  172374                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1506  006460  004767  000222                  JSR     %7,LODBUF       ;LOAD IN BUFFER WITH INCREMENTING PATTERN
1507  006464  004767  000254                  JSR     %7,CHKBFF       ;LOAD CHECK BUFFER WITH MODIFIED INCREMENTING PATTERN
1508  006470  016777  172360  172322          MOV     WCLEN,@DRWC     ;SET UP DRWC
1509  006476  016777  172340  172316          MOV     INBUF,@DRBA     ;SET UP DRBA
1510  006504  012777  177777  172314          MOV     #-1,@DRDB       ;MAINT AIDE
1511  006512  012777  007010  172314          MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
1512  006520  016777  172306  172302          MOV     DRINL,@DRVS     ;INTERRUPT STATUS AT PRIORITY DRINL
1513  006526  005077  172264                  CLR     @PSW            ;LET DR11-B INTERRUPT
1514  006532  012777  010101  172264          MOV     #10101,@DRST    ;MAINT, IE, AND DO TO DRST
1515  006540  000777                          BR      .               ;WAIT FOR INTERRUPT
1516  006542  004767  000336                  JSR     %7,DATCHK
1517
1518                                  ;;*****************************************************************
1519                                  ;       TEST 62 TEST FOR 200 NPR TRANSFERS IN MAINT MODE
1520                                  ;;*****************************************************************
1521  006546  104400                          SCOPE
1522  006550  012767  000200  172270          MOV     #200,BUFLEN     ;LENGTH OF BUFFER = 200
1523  006556  016767  172264  172270          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1524  006564  005467  172264                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1525  006570  004767  000112                  JSR     %7,LODBUF       ;LOAD INBUF WITH INCREMENTING PATTERN
1526  006574  004767  000144                  JSR     %7,CHKBFF       ;LOAD CHKBUF WITH MODIFIED INCREMENTED PATTERN
1527  006600  016777  172250  172212          MOV     WCLEN,@DRWC     ;SET UP DRWC
1528  006606  016777  172230  172206          MOV     INBUF,@DRBA     ;SET UP DRBA
1529  006614  012777  000001  172204          MOV     #1,@DRDB        ;MAINT AIDE
1530  006622  012777  007010  172204          MOV     #INTA,@DRINV    ;INT VECTOR TO INTA
1531  006630  016777  172176  172172          MOV     DRINL,@DRVS     ;INT VECTOR AT PRIORITY DRINL
1532  006636  005077  172154                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1533  006642  012777  010101  172154          MOV     #010101,@DRST   ;FOLLOWING TO DRST:  MAINT(12),IE(06),DO(00)
1534  006650  005267  172176                  INC     BRWAIT          ;USE A WAIT OR BR. INSTRUCTION
1535  006654  032767  000001  172170          BIT     #BIT0,BRWAIT    ;SEE WHICH ONE
1536  006662  001403                          BEQ     BRANCH          ;BIT 0 CLEAR = BR.
```

```
1538  006666  000240                        NOP
1539  006670  000401                        BR      .+4
1540  006672  000777              BRANCH:   BR      .
1541  006674  004767  000204                JSR     %7,DATCHK       ;CHECK THAT CORRECT DATA WAS TRANSFERRED
1542  006700  104400                        SCOPE
1543  006702  000167  000356                JMP     END             ;DO IT ALL AGAIN.
1544  006706  016702  172130      LODBUF:   MOV     INBUF,%2        ;MOVE STARTING ADDRESS OF INBUF TO R2
1545  006712  005067  172132                CLR     LENCHK          ;CLEAR LENGTH CHECK
1546  006716  005022                        CLR     (%2)+           ;CLEAR STARTING ADDRESS OF INBUFF AND INC BY 2
1547  006720  005267  172124      LOADA:    INC     LENCHK          ;INC LENGTH CHECK BY 1
1548  006724  026767  172120  172114        CMP     LENCHK,BUFLEN   ;CHECK FOR DONE
1549  006732  001403                        BEQ     LDEXIT          ;IS INBUF FILLED?
1550  006734  016722  172110                MOV     LENCHK,(%2)+    ;LOAD NEXT BUFFER WORD
1551  006740  000767                        BR      LOADA           ;CONTINUE CHECKING
1552  006742  000207              LDEXIT:   RTS     %7              ;EXIT
1553  006744  016702  172074      CHKBFF:   MOV     CHKBUF,%2       ;STARTING ADDRESS OF CHECK-BUFFER TO R2
1554  006750  005067  172074                CLR     LENCHK          ;CLEAR LENGTH CHECK
1555  006754  005003                        CLR     %3              ;CLEAR R3
1556  006756  010322              CHKA:     MOV     %3,(%2)+        ;MOVE R3 TO CHKBUF ADDRESS AND INC BY 2
1557  006760  010322                        MOV     %3,(%2)+        ;MOVE R3 TO NEXT CHKBUF ADDRESS AND INC BY 2
1558  006762  062767  000002  172060        ADD     #2,LENCHK       ;ADD 2 TO LENGTH CHECK
1559  006770  026767  172054  172050        CMP     LENCHK,BUFLEN   ;CHECK FOR DONE
1560  006776  100003                        BPL     .+10            ;IS CHECK-BUFFER FILLED?
1561  007000  062703  000002                ADD     #2,%3           ;NEXT NUMBER FOR BUFFER
1562  007004  000764                        BR      CHKA            ;CONTINUE FILLING
1563  007006  000207                        RTS     %7              ;EXIT
1564  007010  042777  000100  172006  INTA:   BIC     #BIT6,@DRST     ;CLEAR IE
1565  007016  005777  172002                TST     @DRST           ;CHECKING FOR ERROR
1566  007022  100001                        BPL     .+4             ;ERROR SET?
1567  007024  104000                        HLT                     ;ERROR BIT IS SET
1568  007026  105777  171772                TSTB    @DRST           ;CHECKING READY BIT
1569  007032  100401                        BMI     .+4             ;IS READY SET
1570  007034  104000                        HLT                     ;FALSE INTERRUPT - ERROR AND READY ARE CLEAR
1571  007036  005777  171756                TST     @DRWC           ;TEST1 FOR DRWC=0
1572  007042  001401                        BEQ     .+4             ;WAS IT EQUAL?
1573  007044  104000                        HLT                     ;DRWC NOT =0
1574  007046  016702  171774                MOV     BUFLEN,%2       ;BUFFER LENGTH TO R2
1575  007052  066702  171770                ADD     BUFLEN,%2       ;NUMBER OF TRANSFERS TIMES 2
1576  007056  066702  171760                ADD     INBUF,%2        ;CORRECT DRBA
1577  007062  027702  171734                CMP     @DRBA,%2        ;CHECKING DRBA
1578  007066  001401                        BEQ     .+4             ;IS DRBA CORRECT?
1579  007070  104000                        HLT                     ;DRBA NOT CORRECT
1580  007072  062716  000002                ADD     #2,(%6)         ;RETURN ADDRESS TO RETURN ADDRESS +2
1581  007076  004767  000042                JSR     %7,NORMAL
1582  007102  000002                        RTI                     ;EXIT
1583
1584  007104  016702  171734      DATCHK:   MOV     CHKBUF,%2       ;STARTING ADDRESS OF CHECK BUFFER TO R2
1585  007110  016703  171726                MOV     INBUF,%3        ;STARTING ADDRESS OF IN BUFFER TO R3
1586  007114  005067  171730                CLR     LENCHK          ;CLEAR LENGTH CHECK
1587  007120  005267  171724      COMPAR:   INC     LENCHK          ;MAKE A COMPARISON
1588  007124  022223                        CMP     (%2)+,(%3)+     ;IS THE DATA CORRECT?
1589  007126  001401                        BEQ     .+4             ;BRANCH IF OK
1590  007130  104000                        HLT                     ;BAD DATA
1591  007132  026767  171712  171706        CMP     LENCHK,BUFLEN   ;SEE IF THE BUFFER HAS BEEN CHECKED
1592  007140  001367                        BNE     COMPAR          ;BUFFER CHECKED?
```

```
1594  007144  012777  001030  171662  NORMAL: MOV     #DRVS,@DRINV    ;RESTORE DR11-B INTERRUPT VECTOR
1595  007152  005077  171652          CLR     @DRVS                   ;RESTORE DR11-B INTERRUPT STATUS
1596  007156  012777  000340  171632          MOV     #340,@PSW       ;RESTORE PROC TO PRIORITY LEVEL 7
1597  007164  000207                  RTS     %7                      ;EXIT
1598  007166  012702  052525          DATOCK: MOV     #52525,%2       ;DATO NUMBER TO R2
1599  007172  016703  171644          MOV     INBUF,%3                ;STARTING ADDRESS OF IN BUFFER TO R3
1600  007176  005067  171646          CLR     LENCHK                  ;CLEAR LENGTH CHECK
1601  007202  005267  171642          COMPRR: INC     LENCHK          ;MAKE A COMPARISON
1602  007206  020223                  CMP     %2,(%3)+                ;IS THE DATA CORRECT?
1603  007210  001401                  BEQ     .+4                     ;BRANCH IF OK
1604  007212  104000                  HLT                             ;BAD DATA
1605  007214  026767  171630  171624          CMP     LENCHK,BUFLEN   ;SEE IF THE BUFFER HAS BEEN CHECKED
1606  007222  001367                  BNE     COMPRR                  ;BUFFER CHECKED?
1607  007224  020223                  CMP     %2,(%3)+                ;CHECK END OF BUFFER + 1
1608  007226  001001                  BNE     .+4                     ;SEE IF TOO MANY WORDS WERE TRANSFERRED
1609  007230  104000                  HLT                             ;TOO MANY
1610  007232  000207                  RTS     %7                      ;EXIT
1611  007234  042777  000100  171562  ERRCHK: BIC     #BIT6,@DRST     ;CLEAR IE
1612  007242  005777  171556          TST     @DRST                   ;CHECKING FOR ERROR
1613  007246  100001                  BPL     .+4                     ;ERROR SET?
1614  007250  104000                  HLT                             ;ERROR BIT IS SET
1615  007252  105777  171546          TSTB    @DRST                   ;CHECKING READY BIT
1616  007256  100401                  BMI     .+4                     ;IS RDY SET
1617  007260  104000                  HLT                             ;FALSE ENTRY - ERROR AND READY ARE CLEAR
1618  007262  000207                  RTS     %7                      ;EXIT
1619
1620                                  ;;*****************************************************************
1621                                  ;       END OF PASS
1622                                  ;;*****************************************************************
1623  007264  012737  000207  177566  END:    MOV     #207,@#177566           ;RING BELL
1624  007272  105737  177564          TSTB    @#177564
1625  007276  100375                  BPL     .-4
1626  007300  005267  171570          INC     PASCNT                  ;KEEP TRACK OF PASSES COMPLETED
1627  007304  012702  012677          MOV     #$ENPAS,%2              ;PRINT 'END PASS'
1628  007310  004767  003460          JSR     %7,TTOUT
1629
1630
1631  007314  042777  000020  171474  END1:   BIC     #20,@PSW        ;CLEAR T-BIT
1632  007322  013702  000042          MOV     @#42,%2
1633  007326  001405                  BEQ     TRTRAP
1634  007330  000005                  RESET
1635  007332  004712                  $ENDAD: JSR     %7,(2)
1636  007334  000240                  NOP
1637  007336  000240                  NOP
1638  007340  000240                  NOP
1639                                  ;;*****************************************************************
1640                                  ;       ROUTINE TO CHECK FOR TRACE TRAP TO BE RUN WITH PROGRAM
1641                                  ;;*****************************************************************
1642
1643  007342  004767  002716          TRTRAP: JSR     %7,CKSWR        ;CHECK FOR CONT G
1644  007346  032777  010000  171440          BIT     #10000,@SR      ;SHOULD WE RUN WITH TRACE TRAP
1645  007354  001417                  BEQ     YESTR                   ;YES
1646  007356  005767  000104          TST     YESTR1                  ;NO, HAVE WE RUN WITH TRACE TRAP ON?
1647  007362  001411                  BEQ     TRPA                    ;IF SO RESTORE PREVIOUS CONTENTS
1648  007364  016767  000076  170422          MOV     YESTR1,14
```

```
1650  007400  042777  000020  171410          BIC     #20,@PSW        ;CLEAR TRACE TRAP
1651  007406  000167  171562          TRPA:   JMP     BEGIN           ;START OF TEST WITH TRACE OFF
1652  007412  000000                  TRPB:   0
1653
1654                                  ;;*****************************************************************
1655                                  ;       SAVE OLD CONTENTS, SET UP FOR TRACE TRAP
1656                                  ;;*****************************************************************
1657  007414  016767  170374  000044  YESTR:  MOV     14,YESTR1       ;SAVE ODT PC
1658  007422  016767  170370  000040          MOV     16,YESTR2       ;SAVE ODT STATUS
1659  007430  012767  007472  170356          MOV     #YESRT,14       ;NEW TRAP VECTOR
1660  007436  005067  170354                  CLR     16              ;NEW CONDITION CODES
1661  007442  005077  171350                  CLR     @PSW
1662  007446  005167  177740                  COM     TRPB
1663  007452  100403                          BMI     .+10
1664  007454  052777  000020  171334          BIS     #20,@PSW        ;SET TRACE TRAP
1665  007462  000167  171506                  JMP     BEGIN           ;START OF TEST WITH TRACE ON
1666
1667  007466  000000          YESTR1: 0                               ;STORAGE FOR ODT PC
1668  007470  000000          YESTR2: 0                               ;STORAG FOR ODT STATUS
1669  007472  000002          YESRT:  RTI                             ;RETURN TO PROGRAM FROM TRAP
1670  007474  000000                  HALT                            ;RTI FAILED
1671
1672
1673                                  ;;*****************************************************************
1674                                  ;       BUS TO BUS TEST (DR11-B TO DR11-B)
1675                                  ;;*****************************************************************
1676
1677
1678          000000                  R0=%0
1679          000001                  R1=%1
1680          000002                  R2=%2
1681          000003                  R3=%3
1682          000004                  R4=%4
1683          000005                  R5=%5
1684          000006                  R6=%6
1685          000007                  R7=%7
1686          000007                  PC=%7
1687          000006                  SP=%6
1688
1689          000001                  GO=1
1690          000002                  FNCT1=2                 ;OUTPUT MODE
1691          000004                  FNCT2=4                 ;OUTPUT DIRECTION
1692          000010                  FNCT3=10                ;OUTPUT INTER REQ
1693          000020                  XBA16=20
1694          000040                  XBA17=40
1695          000100                  IE=100
1696          000200                  READY=200
1697          000400                  CYCLE=400
1698          001000                  DSTATA=1000             ;INPUT MODE
1699          002000                  DSTATB=2000             ;INPUT DIRECTION
1700          004000                  DSTATC=4000             ;INPUT INTR REQ
1701          010000                  MAINT=10000
1702          020000                  ATTN=20000
1703          040000                  NEX=40000
1704          100000                  ERROR=100000
```

```
1706
1707
1708  007476  000004                    NWRDXF: 4                       ;# OF WORDS TRANSFERRED UNDER FLAG CONTROL PRIOR TO NPR
1709  007500  000000                    NEXJOB: 0                       ;HOLDS ADDRESS OF READY INTERRUPT ROUTINE
1710  007502  000000                            0                       ;HOLDS ADDRESS OF ERROR INTERRUPT ROUTINE
1711  007504  000000                    JBFLAG: 0                       ;JOB FLAG
1712  007506  000000                    JBCNT:  0                       ;JOB COUNT
1713                                    ;;**************************************************************************
1714                                    ;MASTER START
1715                                    ;;**************************************************************************
1716  007510  000240                    MS1:    NOP
1717  007512  005067  177770                    CLR     JBCNT           ;CLEAR JOB COUNT
1718  007516  012706  014100                    MOV     #BUFF,R6        ;SETUP STACK
1719  007522  004767  000256                    JSR     R7,SETVEC       ;SET UP INTERRUPT VECTORS
1720  007526  005067  177752                    CLR     JBFLAG          ;CLEAR JOB FLAG
1721  007532  012767  010164  177740            MOV     #JOBA0,NEXJOB   ;DO JOBA0 FIRST
1722  007540  012767  000000  177734            MOV     #0,NEXJOB+2     ;NO ERROR RECOVERY
1723  007546  012777  000340  171242            MOV     #340,@PSW       ;LOCK OUT INTERRUPTS
1724  007554  012777  000100  171242            MOV     #IE,@DRST       ;SET INTERRUPT ENABLE
1725  007562  005077  171230                    CLR     @PSW            ;DROP PRIOTIRY TO ZERO
1726  007566  000425                            BR      BACKGD          ;WAIT FOR JOBS IN BACKGROUND
1727
1728
1729                                    ;;**************************************************************************
1730                                    ;       SLAVE START
1731                                    ;;**************************************************************************
1732
1733  007570  000240                    SS1:    NOP
1734  007572  012706  014100                    MOV     #BUFF,R6
1735  007576  004767  000202                    JSR     R7,SETVEC       ;SET UP INTERRUPT VECTORS
1736  007602  005067  177676                    CLR     JBFLAG
1737  007606  012767  010406  177664            MOV     #SJOB1,NEXJOB   ;FOR READY INTERRUPT
1738  007614  012767  010424  177660            MOV     #SJOB2,NEXJOB+2 ;FOR ERROR INTERRUPT
1739  007622  012777  000340  171166            MOV     #340,@PSW       ;RAISE CP PRIORITY TO 7
1740  007630  012777  000100  171166            MOV     #IE,@DRST       ;SET INTERRUPT ENABLE
1741  007636  005077  171154                    CLR     @PSW            ;DROP CP PRIORITY TO 0 AND ENTER BACKGROUND
1742
1743                                    ;;**************************************************************************
1744                                    ;       BACKGROUND PROGRAM; WAITS FOR JBFLAG TO SET
1745                                    ;;**************************************************************************
1746
1747  007642  005200                    BACKGD: INC     R0
1748  007644  005201                            INC     R1
1749  007646  005202                            INC     R2
1750  007650  005203                            INC     R3
1751  007652  005204                            INC     R4
1752  007654  005205                            INC     R5
1753  007656  020005                            CMP     R0,R5
1754  007660  001402                            BEQ     .+6
1755  007662  104000                            HLT
1756  007664  000000                            HALT                    ;BACKGROUND TEST FAILED
1757  007666  020104                            CMP     R1,R4
1758  007670  001402                            BEQ     .+6
1759  007672  104000                            HLT
1760  007674  000000                            HALT                    ;BACKGROUND TEST FAILED
```

```
1762  007700  001402                    BEQ     .+6
1763  007702  104000                    HLT
1764  007704  000000                    HALT                    ;BACKGROUND TEST FAILED
1765  007706  005767  177572            TST     JBFLAG          ;ANY JOBS?
1766  007712  001753                    BEQ     BACKGD          ;BRANCH IF NONE
1767  007714  004567  000032            JSR     R5,SAVALL       ;YES & EXECUTE JOB WHOSE ADDRESS IS IN JBFLAG
1768  007720  005067  177554            CLR     NEXJOB
1769  007724  005067  177552            CLR     NEXJOB+2
1770  007730  016767  177550  170076    MOV     JBFLAG,34
1771  007736  005067  177542            CLR     JBFLAG
1772  007742  104400                    TRAP                    ;TRAP THROUGH JBFLAG AT 34
1773  007744  004567  000016            JSR     R5,RESALL
1774  007750  000734                    BR      BACKGD
1775
1776                          ;;*****************************************************************
1777                          ;       SUBROUTINE TO PUSH ALL REGISTERS ONTO THE STACK
1778                          ;;*****************************************************************
1779
1780  007752  010446          SAVALL: MOV     R4,-(R6)        ;R5 WAS PUSHED BY JSR
1781  007754  010346                  MOV     R3,-(R6)
1782  007756  010246                  MOV     R2,-(R6)
1783  007760  010146                  MOV     R1,-(R6)
1784  007762  010046                  MOV     R0,-(R6)
1785  007764  000115                  JMP     (R5)            ;R5 HOLDS RETURN ADDRESS
1786
1787                          ;;*****************************************************************
1788                          ;       SUBROUTINE TO POP ALL REGISTERS OFF THE STACK
1789                          ;;*****************************************************************
1790
1791  007766  005726          RESALL: TST     (R6)+
1792  007770  012600                  MOV     (R6)+,R0
1793  007772  012601                  MOV     (R6)+,R1
1794  007774  012602                  MOV     (R6)+,R2
1795  007776  012603                  MOV     (R6)+,R3
1796  010000  012604                  MOV     (R6)+,R4
1797  010002  000205                  RTS     R5
1798
1799                          ;;*****************************************************************
1800                          ;       ROUTINE TO SET UP INTERRUPT VECTORS
1801                          ;;*****************************************************************
1802
1803  010004  016700  171024  SETVEC: MOV     DRINV,R0        ;R0 IS VECTOR ADDRRSS
1804  010010  012720  010064          MOV     #DRINS,(R0)+    ;PUT SERVICE ADDRESS INTO VECTOR
1805  010014  016710  171012          MOV     DRINL,(R0)      ;PUT PRIORITY INTO VECTOR+2
1806  010020  012767  011366  170002  MOV     #PRINT,30       ;SET UP EMT ADDRESS
1807  010026  016767  171000  167776  MOV     DRINL,32        ;SET UP EMT PRIORITY LEVEL
1808  010034  005067  167774          CLR     34
1809  010040  016767  170766  167770  MOV     DRINL,36        ;SET UP TRAP ADDRESS
1810  010046  005000                  CLR     R0              ;INITIALIZE REGISTERS
1811  010050  005001                  CLR     R1
1812  010052  005002                  CLR     R2
1813  010054  005003                  CLR     R3
1814  010056  005004                  CLR     R4
1815  010060  005005                  CLR     R5
1816  010062  000207                  RTS     R7
```

```
                                ;       PRIMARY INTERRUPT SERVICE ROUTINE.
                                ;       SETS UP JBLFAG WITH ADDRESS OF JOB TO BE RUNSTARS
                                ;;*****************************************************************
                                
010064  005767  177414        DRINS:  TST     JBFLAG          ;HAS THE PREVIOUS INTERRUPT BEEN SERVICED?
010070  001402                        BEQ     DRINO
010072  104000                        HLT
010074  000000                        HALT                    ;NO
010076  032777  004000  170720  DRINO:  BIT     #DSTATC,@DRST   ;CHECK FOR ERROR
010104  001411                        BEQ     DRIN3           ;BRANCH IF NO ERROR
010106  005767  177370                TST     NEXJOB+2        ;IS THERE AN ERROR SERVICE ROUTINE?
010112  001002                        BNE     DRIN1           ;BRANCH IF THERE IS.
010114  104000                        HLT
010116  000000                        HALT                    ;ERROR INTERRUPT, NO ERROR SERVICE.
010120  016767  177356  177356  DRIN1:  MOV     NEXJOB+2,JBFLAG ;SET UP JOBFLAG WITH ADDRESS OF SERVICE ROUTINE
010126  000002                        RTI
010130  105777  170670        DRIN3:  TSTB    @DRST           ;CHECK READY
010134  100402                        BMI     DRIN2           ;BRANCH IF SET
010136  104000                        HLT
010140  000000                        HALT                    ;INTERRUPT WITHOUT ERROR OR READY
010142  005767  177332        DRIN2:  TST     NEXJOB          ;IS THERE A READY SERVICE ROUTINE
010146  001002                        BNE     .+6             ;BRANCH IF THERE IS.
010150  104000                        HLT
010152  000000                        HALT                    ;READY INTERRUPT, NO READY SERVICE
010154  016767  177320  177322        MOV     NEXJOB,JBFLAG   ;SET UP JOBFLAG WITH SERVICE ROUTINE ADDRESS
010162  000002                        RTI
                                
                                ;;*****************************************************************
                                ;       MASTER'S INTERRUPT SERVICE ROUTINES
                                ;       ROUTINE A, SEGMENT 0
                                ;       FILL BUFFER AND TRANSMIT
                                ;;*****************************************************************
010164  012700  011330        JOBA0:  MOV     #LISTA,R0       ;R0 IS XMIT LIST ADDRESS
010170  012701  011342                MOV     #LISTA1,R1      ;LISTA1 WILL BE REC LIST
010174  012021                        MOV     (R0)+,(R1)+     ;START WITH BUS ADDRESSES EQUAL
010176  012002                        MOV     (R0)+,R2        ;R2 HOLDS WORD COUNT OF XMIT
010200  010211                        MOV     R2,(R1)         ;MAKE REC WORD COUNT THE SAME
010202  005402                        NEG     R2              ;MAKE WORD COUNT POSITIVE
010204  006302                        ASL     R2              ;TRANSFORM INTO BYTE COUNT
010206  060241                        ADD     R2,-(R1)        ;ADD TO REC BUS ADDRESS
010210  005010                        CLR     (R0)            ;CLEAR OFFSET IN XMIT LIST
010212  024040                        CMP     -(R0),-(R0)     ;LEAVE R0=LISTA=XMIT LIST
                                
010214  022767  000100  177264        CMP     #100,JBCNT      ;ENOUGH PASSES FOR BELL?
010222  003010                        BGT     JOBA0A          ;BRANCH IF NOT ENOUGH
010224  105737  177564        JOBA0B: TSTB    @#177564        ;TTY READY?
010230  100375                        BPL     JOBA0B
010232  012737  000207  177566        MOV     #207,@#177566   ;RING BELL
010240  005067  177242                CLR     JBCNT           ;RESET JOB COUNT
010244  004767  000704        JOBA0A: JSR     R7,SETBUF       ;FILL UP XMIT BUFFER WITH SPECIAL BINARY COUNT
010250  012700  011330                MOV     #LISTA,R0
010254  004767  000370                JSR     R7,MXMIT        ;TRANSMIT DATA TO SLAVE
010260  012767  010276  177212        MOV     #JOBA1,NEXJOB   ;JOBA1 IS NEXT
010266  012767  000000  177206        MOV     #0,NEXJOB+2     ;NO ERROR RECOVERY
010274  000002                        RTI                     ;RETURN TO BACKGROUND VIA TRAP
```

```
                                ;;*****************************************************************
                                ;       ROUTINE A, SEGMENT 1
                                ;       FLUSH A BUFFER AND RECEIVE DATA
                                ;;*****************************************************************

010276  012700  011342          JOBA1:  MOV     #LISTA1,R0      ;PUT REC LIST ADDRESS INTO R0
010302  004767  000574                  JSR     R7,FLUSH        ;FLUSH BUFFER
010306  012700  011342                  MOV     #LISTA1,R0
010312  004767  000406                  JSR     R7,MREC         ;RECEIVE DATA FROM SLAVE
010316  012767  010334  177154          MOV     #JOBA2,NEXJOB   ;JOBA2 IS NEXT
010324  012767  000000  177150          MOV     #0,NEXJOB+2     ;NO ERROR RECOVERY
010332  000002                          RTI

                                ;;*****************************************************************
                                ;       ROUTINE A, SEGMENT 2
                                ;       CHECKS TRANSMITTED DATA WITH RECEIVED
                                ;;*****************************************************************

010334  012700  011330          JOBA2:  MOV     #LISTA,R0       ;XMIT BUFFER LIST
010340  012701  011342                  MOV     #LISTA1,R1      ;REC BUFFER LIST
010344  004767  000652                  JSR     R7,BUFCHK       ;COMPARE THE TWO BUFFERS
010350  042777  000100  170446          BIC     #IE,@DRST       ;GLITCH INTERRUPT
010356  012777  000100  170440          MOV     #IE,@DRST
010364  012767  010164  177106          MOV     #JOBA0,NEXJOB   ;REPEAT JOBA0
010372  012767  000000  177102          MOV     #0,NEXJOB+2
010400  005267  177102                  INC     JBCNT           ;ADVANCE COUNT
010404  000002                          RTI

                                ;;*****************************************************************
                                ;       SLAVE'S INTERRUPT SERVICE ROUTINES
                                ;
                                ;       JOB1:  IGNORE FIRST READY INTERRUPT
                                ;;*****************************************************************

010406  012767  000000  177064  SJOB1:  MOV     #0,NEXJOB       ;NO MORE READY INTERRUPTS
010414  012767  010424  177060          MOV     #SJOB2,NEXJOB+2 ;UNTIL ATTN INTERRUPT
010422  000002                          RTI

                                ;;*****************************************************************
                                ;       JOB2:  WAIT FOR COMMAND
                                ;;*****************************************************************

010424  032777  004000  170372  SJOB2:  BIT     #DSTATC,@DRST   ;TEST FOR INTER
010432  001002                          BNE     SJOB2A
010434  104000                          HLT
010436  000000                          HALT                    ;ERROR OTHER THAN DSTATC
010440  005001                  SJOB2A: CLR     R1              ;SET UP FOR PARAMETERS
010442  016702  170356                  MOV     DRST,R2         ;R2 IS STATUS ADDRESS
010446  012703  000010                  MOV     #FNCT3,R3       ;R3 IS FUNCTION BIT 3
010452  012704  004000                  MOV     #DSTATC,R4      ;R4 IS INTERUPT BIT
010456  016705  170344                  MOV     DRDB,R5         ;R5 IS DATA BUFFER ADDRESS
010462  012700  011356                  MOV     #LISTB+2,R0     ;STORE PARAMETERS HERE STARTING WITH WORD COUNT
010466  004767  000122                  JSR     R7,HNDSHK       ;GET PARAMETERS
010472  012700  011354                  MOV     #LISTB,R0       ;R0 IS TOP OF LIST
010476  016010  000004                  MOV     4(R0),(R0)      ;MOVE OFFSET TO TOP
```

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1930  010506  012077  170310                  MOV     (R0)+,@DRBA     ;SET UP BUS ADDRESS
1931  010512  012077  170302                  MOV     (R0)+,@DRWC     ;SET UP WORD COUNT
1932  010516  005077  170302                  CLR     @DRST           ;CLEAR ALL FUNCTION BITS
1933  010522  032777  002000  170274          BIT     #DSTATB,@DRST   ;WHICH DIRECTION
1934  010530  001405                          BEQ     SJOB2C          ;BRANCH IF RECIEVE (LEAVE FNCT1 CLEAR FOR DATI'S)
1935  010532  032777  000400  170264  SJOB2B: BIT     #CYCLE,@DRST    ;WAIT FOR MASTER TO SET CYCLE
1936  010540  001774                          BEQ     SJOB2B          ;BRANCH IF NOT SET
1937  010542  000412                          BR      SJOB2D          ;GO DO THE COMAND
1938  010544  012700  011354          SJOB2C: MOV     #LISTB,R0
1939  010550  004767  000356                  JSR     R7,BLUSH        ;BLUSH THE BUFFER
1940  010554  052777  000004  170242          BIS     #FNCT2,@DRST    ;SET FNCT2 FOR DATO'S
1941  010562  042777  000400  170234          BIC     #CYCLE,@DRST    ;CLEAR CYCLE
1942  010570  052777  000101  170226  SJOB2D: BIS     #IE!GO,@DRST    ;EXECUTE COMMAND AND INTERRUPT WHEN DONE
1943  010576  012767  010406  176674          MOV     #SJOB1,NEXJOB   ;IGNORE READY INTERRUPT
1944  010604  012767  010424  176670          MOV     #SJOB2,NEXJOB+2 ;WAIT FOR ATTN INTERRUPT
1945  010612  000002                          RTI
1946
1947                                  ;;**********************************************************************
1948                                  ;       SLAVE ROUTINE TO ACCEPT PARAMETERS FROM MASTER
1949                                  ;;**********************************************************************
1950
1951  010614  011515          HNDSHK: MOV     (R5),(R5)       ;ECHO PARAMETER
1952  010616  011520                  MOV     (R5),(R0)+      ;STORE PARAMETER
1953  010620  050312                  BIS     R3,(R2)         ;REPLY WITH FNCT3
1954  010622  030412          HNDSH1: BIT     R4,(R2)         ;WAIT FOR ATTN TO DROP
1955  010624  001376                  BNE     HNDSH1
1956  010626  040312                  BIC     R3,(R2)         ;DROP FNCT3
1957  010630  005201                  INC     R1              ;CHECK NUMBER
1958  010632  020167  176640          CMP     R1,NWRDXF
1959  010636  002401                  BLT     HNDSH2          ;BRANCH IF NOT DONE YET
1960  010640  000207                  RTS     R7
1961  010642  030412          HNDSH2: BIT     R4,(R2)         ;WAIT FOR NEXT WORD
1962  010644  001776                  BEQ     HNDSH2          ;BRANCH IF ATTN CLEAR
1963  010646  000762                  BR      HNDSHK          ;GET ANOTHER PARAMETER
1964
1965                                  ;;**********************************************************************
1966                                  ;       MASTER TRANSMIT ROUTINE
1967                                  ;       ENTER WITH TRANSFER LIST IN R0
1968                                  ;;**********************************************************************
1969
1970  010650  005777  170150  MXMIT:  TST     @DRST           ;MAKE SURE ERROR IS CLEAR
1971  010654  100002                  BPL     MXMIT1          ;AND READY IS SET
1972  010656  104000                  HLT
1973  010660  000000                  HALT                    ;ERROR IS SET
1974  010662  105777  170136  MXMIT1: TSTB    @DRST
1975  010666  100402                  BMI     MXMIT2
1976  010670  104000                  HLT
1977  010672  000000                  HALT                    ;READY NOT SET
1978  010674  012777  000000  170122  MXMIT2: MOV     #0,@DRST        ;SET UP FUNCTION FOR DATI'S
1979  010702  004767  000102                  JSR     R7,PRMXFR       ;TRANSFER PARAMETERS OF LIST WHOSE ADDRESS IS IN R0
1980  010706  042777  000400  170110          BIC     #CYCLE,@DRST    ;MAKE SURE CYCLE IS CLEAR
1981  010714  052777  000101  170102          BIS     #IE!GO,@DRST    ;EXECUTE COMMAND AND INTERRUPT WHEN DONE
1982  010722  000207                          RTS     R7
1983
1984                                  ;;**********************************************************************
```

```
                                ;       ENTER WITH TRANSFER LIST IN R0
                                ;;**************************************************************
010724  005777  170074          MREC:   TST     @DRST           ;MAKE SURE ERROR IS CLEAR
010730  100002                  BPL     MREC1           ;AND READY SET.
010732  104000                  HLT
010734  000000                  HALT                    ;ERROR SET
010736  105777  170062          MREC1:  TSTB    @DRST
010742  100402                  BMI     MREC2
010744  104000                  HLT
010746  000000                  HALT                    ;READY CLEAR
010750  012777  000004  170046  MREC2:  MOV     #FNCT2,@DRST    ;SET UP FUNCTION FOR DATO'S
010756  004767  000026          JSR     R7,PRMXFR       ;TRANSFER PARAMETERS OF LIST WHOSE ADDRESS IS IN R0
010762  032777  002000  170034  MREC3:  BIT     #DSTATB,@DRST   ;WAIT FOR SLAVE TO CLEAR DIRECTION
010770  001374                  BNE     MREC3           ;BRANCH IF SET
010772  042777  000400  170024          BIC     #CYCLE,@DRST    ;CLEAR CYCLE
011000  052777  000101  170016          BIS     #IE!GO,@DRST    ;EXECUTE COMMAND AND INTERRUPT WHEN DONE.
011006  000207                          RTS     R7

                                ;;**************************************************************
                                ;       ROUTINE TO TRANSFER AND CHECK PARAMETERS UNDER FLAG CONTROL
                                ;       ENTER WITH R0 POINTING TO TRANSFER LIST
                                ;;**************************************************************

011010  012077  170006          PRMXFR: MOV     (R0)+,@DRBA     ;FIRST WORD IN LIST IS ADDRESS
011014  011077  170000                  MOV     (R0),@DRWC      ;SECOND WORD IN LIST IS WORD COUNT
011020  005001                          CLR     R1              ;R1 COUNTS PARAMETERS TRANSFERRED
011022  016702  167776                  MOV     DRST,R2         ;R2 IS THE STATUS ADDRESS
011026  012703  000010                  MOV     #FNCT3,R3       ;R3 USED FOR FUNCTION BIT 3
011032  012704  004000                  MOV     #DSTATC,R4      ;R4 USED FOR INTERUPT BIT
011036  016705  167764                  MOV     DRDB,R5         ;R5 IS THE DATA BUFFER ADDRESS
011042  011015                  PRMXF1: MOV     (R0),(R5)       ;SET UP DRDB WITH PARAMETER
011044  050312                          BIS     R3,(R2)         ;CALL SLAVE'S ATTN
011046  030412                  PRMXF2: BIT     R4,(R2)         ;WAIT FOR REPLY
011050  001776                          BEQ     PRMXF2          ;BRANCH IF ATTN CLEAR
011052  022015                          CMP     (R0)+,(R5)      ;COMPARE PARAMETER SENT WITH SLAVE'S ECHO
011054  001402                          BEQ     PRMXF3          ;BRANCH IF EQUAL
011056  104000                          HLT
011060  000000                          HALT                    ;PARAMETER DID NOT ECHO
011062  040312                  PRMXF3: BIC     R3,(R2)         ;DROP SLAVE'S ATTN
011064  030412                  PRMXF4: BIT     R4,(R2)         ;WAIT FOR REPLY
011066  001376                          BNE     PRMXF4          ;BRANCH IF ATTN SET
011070  005201                          INC     R1              ;ADVANCE PARAMETER COUNT
011072  020167  176400                  CMP     R1,NWRDXF       ;ALL PARAMETER XFERRED?
011076  002761                          BLT     PRMXF1          ;BRANCH IF NOT DONE
011100  000207                          RTS     R7              ;RETURN WHEN ALL PARAMETERS TRANSFERRED AND CHECKED.

                                ;;**************************************************************
                                ;       ROUTINE TO CLEAR BUFFER
                                ;       ENTER WITH R0 POINTING TO TRANSFER LIST
                                ;;**************************************************************

011102  005005                  FLUSH:  CLR     R5              ;SET R5 TO ZIP
011104  004767  000030                  JSR     R7,BSETUP       ;SET UP REGISTERS
011110  004767  000004          FLUSH1: JSR     R7,BUFPUT       ;STORE ITEM IN BUFFER
011114  002775                          BLT     FLUSH1
```

```
                                ;;*****************************************************************
                                ;       ROUTINE TO FILL BUFFER WITH ALL ONE'S
                                ;       ENTER WITH R0 POINTING TO TRANSFER LIST
                                ;;*****************************************************************
011132  012705  177777  BLUSH:  MOV     #-1,R5          ;SET R5 TO ALL ONE'S
011136  000762                 BR      FLUSH+2

                        ;REGISTER SETUP ROUTINE
011140  012001          BSETUP: MOV     (R0)+,R1        ;R1 IS BUS ADDRESS
011142  012002                  MOV     (R0)+,R2        ;R2 IS WORD COUNT
011144  005720                  TST     (R0)+           ;SKIP OVER OFFSET
011146  005003                  CLR     R3              ;CLEAR LOW CHECKSUM
011150  005004                  CLR     R4              ;CLEAR HIGH CHECKSUM
011152  000207                  RTS     R7              ;RETURN

                                ;;*****************************************************************
                                ;       ROUTINE TO FILL BUFFER WITH FLOATING 1'S AND FLOATING 0'S PATTERN
                                ;       ENTER WITH R0 POINTING TO TRANSFER LIST
                                ;;*****************************************************************
011154  004767  177760  SETBUF: JSR     R7,BSETUP       ;SET UP REGISTERS
011160  012705  000001  SETBF1: MOV     #1,R5           ;SET UP R5 WITH START PATTERN
011164  004767  177730  SETBF2: JSR     R7,BUFPUT       ;NUMBER TO BUFFER
011170  002011                  BGE     BUFOUT
011172  005105                  COM     R5
011174  004767  177720          JSR     R7,BUFPUT       ;COMPLEMENT OF NUMBER TO BUFFER
011200  002005                  BGE     BUFOUT
011202  005105                  COM     R5              ;MOVE PATTERN ONE BIT
011204  000241                  CLC                     ;POSITION TO THE LEFT
011206  006105                  ROL     R5
011210  103763                  BCS     SETBF1          ;IF CARRY SET, START PATTERN OVER
011212  000764                  BR      SETBF2
011214  010320          BUFOUT: MOV     R3,(R0)+        ;MOVE LOW CHECK TO LIST
011216  010420                  MOV     R4,(R0)+        ;MOVE HIGH CHECK TO LIST
011220  000207                  RTS     R7              ;RETURN

                                ;;*****************************************************************
                                ;       ROUTINE TO COMPARE TWO BUFFERS
                                ;       BUFFER LIST #1 IS IN R1
                                ;       BUFFER LIST #2 IS IN R0.   #2 CHECKED FOR PROPER CHECKSUM
                                ;;*****************************************************************

011222  010046          BUFCHK: MOV     R0,-(R6)        ;SAVE LIST#2 ON STACK
011224  010146                  MOV     R1,-(R6)        ;SAVE LIST#1 ON STACK
011226  004767  000036          JSR     R7,CHKSUM       ;VERIFY INTEGRITY OF CHECK BUFFER (#2)
011232  012600                  MOV     (R6)+,R0        ;RECOVER 1ST LIST POINTER
011234  012001                  MOV     (R0)+,R1        ;BUS ADDRESS #1
011236  012002                  MOV     (R0)+,R2        ;WORD COUNT #1
```

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2098   011242  012003                  MOV     (R0)+,R3        ;BUS ADDRESS #2
2099   011244  020220                  CMP     R2,(R0)+        ;COMPARE WORD COUNTS
2100   011246  003402                  BLE     BUFCK1          ;BRANCH IF EQUAL OR LESS THAN
2101   011250  104000                  HLT                     ;BUFFER 2 IS LONGER THAN 1
2102   011252  000000                  HALT
2103
2104   011254  022123          BUFCK1: CMP     (R1)+,(R3)+     ;COMPARE BUFFERS
2105   011256  001401                  BEQ     BUFCK2
2106   011260  104000                  HLT                     ;DATA ERROR
2107   011262  005202          BUFCK2: INC     R2              ;ADVANCE COUNT
2108   011264  002773                  BLT     BUFCK1          ;BRANCH IF NOT DONE
2109   011266  000207                  RTS     R7              ;RETURN; STACK IS CLEAR
2110
2111                            ;;**********************************************************************
2112                            ;       ROUTINE TO CHECK SUM OF BUFFER
2113                            ;       ENTER WITH R0 POINTING TO TRANSFER LIST
2114                            ;;**********************************************************************
2115   011270  004767  177644  CHKSUM: JSR     R7,BSETUP       ;SET UP REGISTERS
2116   011274  004767  000016  CHKSM1: JSR     R7,GETBUF       ;GET ITEM FROM BUFFER
2117   011300  002775                  BLT     CHKSM1          ;BRANCH IF NOT DONE
2118   011302  020320                  CMP     R3,(R0)+        ;COMPARE LOW ORDER CHECKS
2119   011304  001003                  BNE     CHKSM2
2120   011306  020420                  CMP     R4,(R0)+        ;COMPARE HIGH ORDER CHECKS
2121   011310  001001                  BNE     CHKSM2
2122   011312  000207                  RTS     R7              ;RETURN IF CHECKSUM OK.
2123   011314  104000          CHKSM2: HLT                     ;ORIGINAL BUFFER CHECKSUM DOES NOT AGREE WITH PRESENT
2124
2125   011316  012105          GETBUF: MOV     (R1)+,R5        ;GET ITEM OUT OF BUFFER
2126   011320  060503                  ADD     R5,R3           ;ADD TO CHECKSUM
2127   011322  005504                  ADC     R4
2128   011324  005202                  INC     R2              ;ADVANCE WORD COUNT
2129   011326  000207                  RTS     R7
2130
2131   011330  014102          LISTA:  XINBUF                  ;START OF XMIT BUFFER
2132   011332  177605                  -123.                   ;WORD COUNT
2133   011334  000000                  0                       ;OFFSET
2134   011336  000000                  0                       ;CHECKSUM LOW
2135   011340  000000                  0                       ;CHECKSUM HIGH
2136
2137   011342  000000          LISTA1: 0                       ;START OF REC BUFFER
2138   011344  000000                  0                       ;WORD COUNT
2139   011346  000000                  0                       ;OFFSET
2140   011350  000000                  0                       ;CHECKSUM LOW
2141   011352  000000                  0                       ;CHECKSUM HIGH
2142
2143   011354  014102          LISTB:  XINBUF                  ;SLAVE'S ECHO BUFFER
2144   011356  000000                  0
2145   011360  000000                  0
2146   011362  000000                  0
2147   011364  000000                  0
2148
2149
2150                            ;;**********************************************************************
2151                            ;       ENTERED WITH SYSTEM TRAP CALL(HLT)
2152                            ;       PRINT OUT THE ERROR PC AND STATUS REGISTER
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```
2154
2155
2156  011366  004767  000672          PRINT:  JSR     %7,CKSWR
2157  011372  037727  167416  020000          BIT     @SR,#20000      ;TEST FOR INHIBIT PRINT OUT
2158  011400  001067                          BNE     1$              ;IF SO, BRANCH OVER PRINT
2159  011402  012667  000204                  MOV     (6)+,SAVPC      ;PC OF FAILING ROUTINE
2160  011406  012667  000202                  MOV     (6)+,SAVCC      ;CC OF ERROR CONDITION
2161  011412  024646                          CMP     -(6),-(6)       ;REPOSITION THE STACK
2162  011414  012777  000215  167444          MOV     #215,@TPB       ;CR
2163  011422  105777  167436                  TSTB    @TPS
2164  011426  100375                          BPL     .-4
2165  011430  012777  000212  167430          MOV     #212,@TPB       ;LINE FEED
2166  011436  105777  167422                  TSTB    @TPS
2167  011442  100375                          BPL     .-4
2168  011444  010267  000134                  MOV     %2,SAVR2        ;SAVE R2
2169  011450  010367  000132                  MOV     %3,SAVR3        ;SAVE R3
2170  011454  010467  000130                  MOV     %4,SAVR4        ;SAVE R4
2171  011460  016702  000126                  MOV     SAVPC,%2
2172  011464  004767  000126                  JSR     %7,PRTAB        ;PRINT OCTAL NUMBER
2173  011470  012777  000240  167370          MOV     #240,@TPB
2174  011476  105777  167362                  TSTB    @TPS            ;SPACE BETWEEN WORDS
2175  011502  100375                          BPL     .-4
2176  011504  016702  000104                  MOV     SAVCC,%2
2177  011510  004767  000102                  JSR     %7,PRTAB        ;PRINT OCTAL NUMBER
2178  011514  012777  000240  167344          MOV     #240,@TPB       ;PRINT SPACE
2179  011522  105777  167336                  TSTB    @TPS            ;PRINTER DONE
2180  011526  100375                          BPL     .-4             ;BRANCH WHEN NOT DONE
2181  011530  017702  167270                  MOV     @DRST,%2        ;GET DR11B STATUS
2182  011534  004767  000056                  JSR     %7,PRTAB        ;PRINT OCTAL NUMBER
2183  011540  016702  000040                  MOV     SAVR2,%2
2184  011544  016703  000036                  MOV     SAVR3,%3
2185  011550  016704  000034                  MOV     SAVR4,%4
2186  011554  004767  000504                  JSR     %7,CKSWR
2187  011560  005777  167230          1$:     TST     @SR             ;CHECK SR FOR HALT SWITCH
2188  011564  100001                          BPL     .+4
2189  011566  000000                          HALT                    ;HALT ON ERROR UP IN SWR
2190  011570  023737  000042  000046          CMP     @#42,@#46       ;ARE WE IN ACT11 AUTO MODE?
2191  011576  001001                          BNE     .+4             ;BRANCH ON NO
2192  011600  000000                          HALT                    ;HALT ON ERROR IF IN ACT11 AUTO MODE
2193  011602  000002                          RTI                     ;RETURN TO MAINLINE
2194  011604  000000                  SAVR2:  0
2195  011606  000000                  SAVR3:  0
2196  011610  000000                  SAVR4:  0
2197  011612  000000                  SAVPC:  0
2198  011614  000000                  SAVCC:  0
2199
2200  011616  005067  000260          PRTAB:  CLR     BINCT
2201  011622  005067  000252                  CLR     WGTCT
2202  011626  012704  012106                  MOV     #LIST,%4        ;GET LIST ADDRESS
2203  011632  142777  000177  167224          BICB    #177,@TPS       ;CLR INT FLAG
2204  011640  012767  000005  000236          MOV     #5,ASCNT
2205  011646  012767  000007  000220          MOV     #7,SEVEN
2206  011654  012767  000001  000214          MOV     #1,DECML
2207  011662  105777  167176          WAIT1:  TSTB    @TPS
2208  011666  100375                          BPL     WAIT1
```

```
2210  011672  100404                        BMI     MINUS           ;NEG SIGN PRINT 1
2211  011674  012777  000260  167164        MOV     #260,@TPB       ;POS SIGN PRINT 0
2212  011702  000403                        BR      START
2213  011704  012777  000261  167154  MINUS: MOV     #261,@TPB
2214  011712  016703  000156        START:  MOV     SEVEN,%3        ;PUT MASK IN R3
2215  011716  010267  000150                MOV     %2,TOODLE       ;GET READY TO DOODLE NUMBER IN TOODLE
2216  011722  005167  000144                COM     TOODLE          ;COMPENSATES FOR COMPLEMENT DURING BIC
2217  011726  046703  000140                BIC     TOODLE,%3       ;AND IN OCTAL CHARACTER
2218  011732  001410                        BEQ     WRTOC           ;ZERO, WRITE 0 IN LIST
2219  011734  066767  000136  000136  MKNUM: ADD     DECML,WGTCT     ;COUNT UP TO
2220  011742  005267  000134                INC     BINCT           ;AND RECORD
2221  011746  026703  000126                CMP     WGTCT,%3        ;SAME BINARY WEIGHT
2222  011752  001370                        BNE     MKNUM           ;KEEP COUNTN
2223  011754  062767  000260  000120  WRTOC: ADD     #260,BINCT      ;ADD ASCII PREFIX
2224  011762  016724  000114                MOV     BINCT,(4)+      ;WRITE ASCII CHAR IN LIST
2225  011766  066767  000102  000102        ADD     SEVEN,DECML     ;EXPAND BINARY WEIGHT
2226  011774  005067  000100                CLR     WGTCT
2227  012000  005067  000076                CLR     BINCT
2228  012004  005367  000074                DEC     ASCNT
2229  012010  001410                        BEQ     XLIST           ;5 CHAR IN LIST
2230  012012  012703  000003                MOV     #3,%3           ;SET X3 FOR ADD LOOP
2231  012016  066767  000052  000050  MOADD: ADD     SEVEN,SEVEN     ;MAKING SEVENTY BY SEVEN
2232  012024  005303                        DEC     %3
2233  012026  001373                        BNE     MOADD
2234  012030  000730                        BR      START           ;NX SEVEN SET GET NX OCTAL
2235  012032  012767  000005  000044  XLIST: MOV     #5,ASCNT        ;SEND 5 CHAR TO TTY
2236  012040  105777  167020        WAIT2:  TSTB    @TPS
2237  012044  100375                        BPL     WAIT2
2238  012046  014477  167014                MOV     -(4),@TPB
2239  012052  005367  000026                DEC     ASCNT
2240  012056  001401                        BEQ     HDFHM           ;FINISH PRINTING GET NXT NUM
2241  012060  000767                        BR      WAIT2
2242  012062  105777  166776  HDFHM:  TSTB @TPS
2243  012066  100375                        BPL     .-4
2244  012070  000207                        RTS     %7              ;HEAD FOR HOME
2245  012072  000000  TOODLE:  0
2246  012074  000000  SEVEN:   0
2247  012076  000000  DECML:   0
2248  012100  000000  WGTCT:   0
2249  012102  000000  BINCT:   0
2250  012104  000000  ASCNT:   0
2251  012106  000000  LIST:    0
2252  012110  000000           0
2253  012112  000000           0
2254  012114  000000           0
2255  012116  000000           0
2256                  ;;*****************************************************************
2257                  ;       SCOPE LOOP ROUTINE ENTERED BY USER TRAP
2258                  ;;*****************************************************************
2259
2260
2261  012120  004767  000140  SCOPEA: JSR     %7,CKSWR
2262  012124  032777  040000  166662        BIT     #40000,@SR
2263  012132  001003                        BNE     SCOPEB          ;SCOPE, BIT IS A ONE
2264  012134  011667  000106                MOV     @%6,RETURN      ;NO - SAVE PC FOR NEXT TIME
```

```
                                SCOPEB: CMP     (6)+,%6         ;REPOSITION THE STACK
                                        MOV     (6)+,@PSW
                                        JMP     @RETURN         ;SCOPE RETURN

                                ;;*****************************************************************
                                ;       SCOPE OR/AND ITERATION LOOP FOR EACH TEST 4000 TIMES
                                ;;*****************************************************************

                                SCOPEC: JSR     %7,CKSWR
                                        BIT     #40000,@SR      ;TEST SR FOR SCOPE
                                        BNE     SCOPEB          ;YES SCOPE
                                        TST     PASCNT          ;FIRST PASS (PASCNT=0) ?
                                        BEQ     SCOPEG          ;BR IF YES, INHIBIT ITERATIONS
                                        JSR     %7,CKSWR
                                        BIT     #4000,@SR       ;TEST FOR ITERATION
                                        BNE     SCOPEG          ;INHIBIT ITERATION
                                        CMP     SCOPEF,ICOUNT
                                        BEQ     SCOPEG          ;EXIT - DONE
                                        INC     SCOPEF          ;INCREMENT COUNT
                                        BR      SCOPEB          ;LOOP SOME MORE
                                SCOPEG: CLR     SCOPEF          ;CLEAR COUNT
                                        MOV     @%6,RETURN      ;SAVE SCOPE RETURN POINTER
                                        RTI                     ;RETURN INLINE-NEXT TEST
                                ICOUNT: 4000
                                SCOPEF: 0                       ;COUNT LOCATION FOR ITERATION LOOP
                                RETURN: BEGIN                   ;ADDRESS OF LAST TEST
                                        .EVEN
                                        JMP     200

                                ;;*****************************************************************
                                ;       CHECK SWITCH REGISTER ROUTINE. CHECKS FOR ↑G TO ALLOW CHANGING
                                ;       OF LOC. 176.
                                ;;*****************************************************************
                                        TEMPST: .WORD   0
                                        COUNT:  .WORD   0
                                        RDSW:   .WORD   0
                                        TIB:    .WORD   0

                                CKSWR:  CMP     #SWREG,SR       ;SOFTWARE SWITCH REGISTER PRESENT
                                        BNE     OUT
                                        TSTB    @TKS            ;YES,WAIT FOR
                                        BPL     OUT             ;READY, GET CHARACTER
                                        MOV     @TKB,TIB        ;AND STRIP OFF
                                        BIC     #177600,TIB     ;THE GARBAGE
                                        CMP     #7,TIB          ;IS IT A <↑G>
                                        BNE     OUT
                                        MOV     #$CNTG,%2
                                        JSR     PC,TTOUT
                                CNTLU:  MOV     #$MSWR,%2
                                        JSR     PC,TTOUT
                                        MOV     @SR,%2
                                        JSR     %7,PRTAB
                                        MOV     #$MNEW,%2
```

```
2322  012366  005037  012254                 CLR     @#TEMPST
2323  012372  005067  177656          $READ: CLR     TEMPST
2324  012376  012767  000007  177652         MOV     #7,COUNT
2325  012404  004767  000154          1$:    JSR     PC,TIIN         ;GO  READ A CHARACTER
2326  012410  042767  177600  177644         BIC     #177600,TIB     ;STRIP OFF GARBAGE
2327  012416  122767  000025  177636         CMPB    #25,TIB         ;IS IT A ↑U?
2328  012424  001001                         BNE     2$              ;BRANCH IF NOT
2329  012426  000743                  3$:    BR CNTLU                ;START OVER
2330  012430  122767  000015  177624  2$:    CMPB    #15,TIB         ;IS IT A <CR>?
2331  012436  001011                         BNE     4$              ;BRANCH IF NOT
2332  012440  012702  012644                 MOV     #$CRLF,%2
2333  012444  004767  000324                 JSR     %7,TTOUT
2334  012450  022767  000007  177600         CMP     #7,COUNT        ;WAS IT FIRST CHARACTER
2335  012456  001036                         BNE     7$              ;CHANGE SWR IF NOT FIRST ONE
2336  012460  000440                  8$:    BR      OUT             ;GET OUT
2337  012462  122767  000060  177572  4$:    CMPB    #60,TIB
2338  012470  003004                         BGT     5$
2339  012472  122767  000067  177562         CMPB    #67,TIB
2340  012500  002005                         BGE     6$
2341  012502  012702  012671          5$:    MOV     #$QUEST,%2
2342  012506  004767  000262                 JSR     PC,TTOUT
2343  012512  000745                         BR      3$              ;START OVER IF NOT LEGAL CHARACTER
2344  012514  006367  177534          6$:    ASL     TEMPST
2345  012520  006367  177530                 ASL     TEMPST
2346  012524  006367  177524                 ASL     TEMPST
2347  012530  142767  000060  177524         BICB    #60,TIB         ;GET NITTY-GRITTY
2348  012536  156767  177520  177510         BISB    TIB,TEMPST
2349  012544  005367  177506                 DEC     COUNT           ;ONLY WANT 6   DIGITS
2350  012550  001754                         BEQ     5$
2351  012552  000714                         BR      1$
2352  012554  016777  177474  166232  7$:    MOV     TEMPST,@SR      ;CHANGE SWITCH REGISTER CONTENTS
2353  012562  000207                  OUT:   RTS     %7              ;RETURN TO PROGRAM
2354                                  ;;**************************************************************
2355                                  ;       TTY READ SUBROUTINE**********
2356                                  ;;**************************************************************
2357
2358
2359
2360  012564  005077  166270          TTIN:  CLR     @TKS
2361  012570  005077  166266                 CLR     @TKB
2362  012574  005067  177462                 CLR     TIB
2363  012600  005277  166254                 INC     @TKS
2364  012604  105777  166250          TTIN1: TSTB    @TKS
2365  012610  100375                         BPL     TTIN1
2366  012612  017767  166244  177442         MOV     @TKB,TIB
2367  012620  105777  166240          TTIN2: TSTB    @TPS
2368  012624  100375                         BPL     TTIN2
2369  012626  116777  177430  166232         MOVB    TIB,@TPB
2370
2371  012634  000207                         RTS     %7
2372  012636  057137  020107  000046  $CNTG: .ASCIZ  '←↑G &'
2373  012644  020137  000046  $CRLF: .ASCIZ  '← &'
2374  012650  051537  051127  020075  $MSWR: .ASCIZ  '←SWR= &'
2375  012656  000046
2376  012660  020040  042516  036527  $MNEW: .ASCIZ  '  NEW= &'
```

```
2378  012671  137     020077  023137  $QUEST: .ASCIZ  '←? ←&'
2379  012676  000
2380  012677  137     047105  020104  $ENPAS: .ASCIZ  '←END PASS   &'
2381  012704  040520  051523  020040
2382  012712  023040  000
2383  012715  137     046440  044501  $TITLE: .ASCIZ  '← MAINDEC-11-DZDRB-F, DR11B LOGIC TEST   ←&'
2384  012722  042116  041505  030455
2385  012730  026461  055104  051104
2386  012736  026502  026106  042040
2387  012744  030522  041061  046040
2388  012752  043517  041511  052040
2389  012760  051505  020124  020040
2390  012766  023137  000
2391          012772                  .EVEN
2392
2393  012772  000000          OFL:    0                               ;FIRST CHAR FLAG
2394
2395
2396                          ;;**************************************************************
2397                          ;       TTY ASCII OUTPUT ROUTINE
2398                          ;;**************************************************************
2399
2400
2401  012774  105712          TTOUT:  TSTB    (2)                     ;CHECK FOR NULL CHARACTER
2402  012776  001403                  BEQ     1$                      ;IF NOT, TYPE THE CHARACTER
2403  013000  122712  000046        CMPB    #'&,(2)                 ;CHECK FOR TERMINATOR
2404  013004  001005                  BNE     .EMPTY
2405  013006  042777  000100  166050 1$:     BIC     #100,@TPS
2406  013014  005002                  CLR     %2                      ;CLEAR POINTER TO CHARACTER
2407  013016  000207                  RTS     %7                      ;RETURN
2408  013020  122712  000137        .EMPTY: CMPB    #'←,(2)                 ;CRLF CHAR?
2409  013024  001411                  BEQ     .RET
2410  013026  122712  000041        CMPB    #'!,(2)                 ;CHECK FOR RETURN TERMINATOR
2411  013032  001414                  BEQ     .REST
2412  013034  105777  166024        1$:     TSTB    @TPS
2413  013040  100375                  BPL     1$
2414  013042  112277  166020        MOVB    (2)+,@TPB               ;TYPE CHARACTER
2415  013046  000752                  BR      TTOUT
2416  013050  005202          .RET:   INC     %2
2417  013052  010267  000020        MOV     %2,.SAV                 ;SET UP NEW POINTER
2418  013056  012702  013072        MOV     #.RETR,%2
2419  013062  000767                  BR      .RET-6
2420  013064  016702  000006        .REST:  MOV     .SAV,%2
2421  013070  000741                  BR      TTOUT
2422
2423  013072  015     012     041  .RETR:  .BYTE   15,12,'!
2424          013076                  .EVEN
2425  013076  000000          .SAV:   0
2426          014100                  .=.+1000
2427  014100  000000          BUFF:   0                               ;FOR STACK POINTER 100 LOCATIONS
2428  014102  014102          XINBUF: .
2429          015104                  .=.+1000
2430  015104  015104          XCHKBU: .
```

```
ASCNT   012104          2204* 2228* 2235* 2239* 2250#
ATTN  = 020000          1702#
BACKGD  007642          1726  1747# 1766  1774
BADFCK  005132          1257  1263#
BEGIN   001174           568   570   572#  573  1651  1665  2292
BINCT   012102          2200* 2220* 2223* 2224  2227* 2249#
BIT0  = 000001           474# 1352  1430  1457  1535
BIT1  = 000002           475#  658   659   662   663   772   797  1040
BIT10 = 002000           484# 1049
BIT11 = 004000           485# 1057
BIT12 = 010000           486#  757   758   761   762   793   819
BIT13 = 020000           487# 1070
BIT14 = 040000           488# 1073  1075  1076  1242  1245  1271
BIT15 = 100000           489#
BIT2  = 000004           476#  675   676   679   680   775   800  1048
BIT3  = 000010           477#  692   693   696   697   778   803  1056
BIT4  = 000020           478#  705   706   709   710   722   723   781   806
BIT5  = 000040           479#  718   719   784   809
BIT6  = 000100           480#  731   732   735   736   787   813   913   915   918   935   937   940
                          960   962   968   989  1019  1235  1263  1564  1611
BIT7  = 000200           481#  904   908   926   930   949   953   978   982  1010  1014  1340
BIT8  = 000400           482#  744   745   748   749   790   816
BIT9  = 001000           483# 1041
BLUSH   011132          1939  2053#
BRANCH  006672          1536  1540#
BRWAIT  001052           544# 1429* 1430  1456* 1457  1534* 1535
BSETUP  011140          2038  2057# 2069  2115
BUFCHK  011222          1894  2091#
BUFCK1  011254          2100  2104# 2108
BUFCK2  011262          2105  2107#
BUFF    014100           509  1718  1734  2427#
BUFLEN  001046           542# 1149* 1151* 1152  1170* 1172* 1173  1189* 1191  1208* 1210* 1211  1418*
                         1420  1444* 1446* 1447  1469* 1475* 1495* 1503* 1504  1522* 1523  1548  1559
                         1574  1575  1591  1605
BUFOUT  011214          2041  2072  2075  2081#
BUFPUT  011120          2039  2043# 2071  2074
BUSERR= 000004           491#  582*  593#
CHKA    006756          1556# 1562
CHKBFF  006744          1472  1507  1526  1553#
CHKBUF  001044           541# 1553  1584
CHKSM1  011274          2116# 2117
CHKSM2  011314          2119  2121  2123#
CHKSUM  011270          2093  2115#
CKSWR   012264           604   620   836   906   928   951   980  1012  1280  1290  1338  1643  2156
                        2186  2261  2275  2280  2306#
CNTLU   012336           571  2316# 2329
COMPAR  007120          1587# 1592
COMPRR  007202          1601# 1606
COUNT   012256          2302# 2324* 2334  2349*
CYCLE = 000400          1697# 1935  1941  1980  2000
DATCHK  007104          1497  1516  1541  1584#
DATINB  006066          1431  1435#
DATOCK  007166          1183  1221  1463  1598#
DATONB  006226          1458  1462#
DECML   012076          2206* 2219  2225* 2247#
```

```
DONE    005570  1374  1379#
DRBA    001022   532#   586*   619*   622    645*   646    861*   862    865*   866    889*   890    893*
                1079*  1084*  1100   1116*  1132   1155*  1176*  1194*  1214*  1228*  1256*  1278*  1352
                1364*  1387*  1398*  1423*  1450*  1470*  1509*  1528*  1577   1930*  2009*
DRDB    001026   534#   590*  1085*  1103   1118*  1156*  1162   1177*  1195*  1201   1215*  1289*  1292
                1301*  1302   1310*  1311   1314*  1315   1325*  1326   1329*  1424*  1436   1451*  1510*
                1529*  1924   2015
DRINL   001032   536#  1120   1158   1179   1197   1217   1230   1258   1426   1453   1478   1512   1531
                1805   1807   1809
DRINS   010064  1804  1822#
DRINV   001034   537#   911*   933*   958*   987*   992*   999*  1017*  1022*  1028*  1087*  1119*  1157*
                1178*  1196*  1216*  1229*  1257*  1388*  1397*  1425*  1452*  1477*  1511*  1530*  1594*
                1803
DRINO   010076  1823  1826#
DRIN1   010120  1829  1832#
DRIN2   010142  1835  1838#
DRIN3   010130  1827  1834#
DRST    001024   533#   588*   658*   659    662*   663    675*   676    679*   680    692*   693    696*
                 697    705*   706    709*   710    718*   719    722*   723    731*   732    735*   736
                 744*   745    748*   749    757*   758    761*   762    770*   772    775    778    781
                 784    787    790    793    796*   797    800    803    806    809    813    816    819
                 829*   831    838    904    908    913*   915*   918*   926    930    935*   937*   940*
                 949    953    960*   962*   968*   978    982    989*   991*   997*  1010   1014   1019*
                1021*  1026*  1036*  1037   1040*  1041   1044   1047*  1048*  1049   1052   1055*  1056*
                1057   1060   1063*  1068   1070   1073   1075*  1076   1080   1090*  1109*  1122*  1142*
                1160*  1181*  1199*  1219*  1232*  1235*  1236   1239   1242   1245*  1260*  1263*  1265
                1268   1271*  1272   1275   1340   1343   1365   1368*  1369   1373   1391*  1394   1399*
                1401*  1407   1428*  1455*  1473*  1481*  1484   1514*  1533*  1564*  1565   1568   1611*
                1612   1615   1724*  1740*  1826   1834   1895*  1896*  1916   1921   1932*  1933   1935
                1940*  1941*  1942*  1970   1974   1978*  1980*  1981*  1988   1992   1996*  1998   2000*
                2001*  2012   2181
DRVS    001030   535#  1088*  1120*  1158*  1179*  1197*  1217*  1230*  1258*  1389*  1426*  1453*  1478*
                1512*  1531*  1594   1595*
DRWC    001020   531#   584*   603*   606    634*   635    848*   849    852*   853    876*   877    880*
                1083*  1097   1115*  1129   1154*  1175*  1193*  1213*  1227*  1255*  1363*  1386*  1400*.
                1422*  1449*  1480*  1508*  1527*  1571   1931*  2010*
DSTATA= 001000  1698#
DSTATB= 002000  1699#  1933   1998
DSTATC= 004000  1700#  1826   1916   1923   2014
END     007264  1543  1623#
END1    007314  1631#
ERRA    001252   582    592#
ERRCHK  007234  1096  1128   1611#
ERRDO   005644  1388  1394#
ERRDO1  005726  1397  1407#
ERROR = 100000  1704#
FLUSH   011102  1880  2037#  2054
FLUSH1  011110  2039#  2040
FNCCNT  001070   551#  1474#  1487   1490*  1491
FNCT1 = 000002  1690#
FNCT2 = 000004  1691#  1940   1996
FNCT3 = 000010  1692#  1922   2013
GETBUF  011316  2116  2125#
GO    = 000001  1689#  1942   1981   2001
HDFHM   012062  2240  2242#
```

```
                    712     721     725     734     738     747     751     760     764     774     777     780     783
                    786     789     792     795     799     802     805     808     811     815     818     821     835
                    841     851     855     864     868     879     892     910     919     932     941     955     965
                    971     984     995    1002    1016    1024    1039    1043    1046    1051    1054    1059    1062
                   1072    1078    1082    1094    1099    1102    1105    1126    1131    1134    1138    1164    1203
                   1234    1238    1241    1244    1262    1267    1270    1274    1277    1294    1304    1313    1317
                   1328    1342    1345    1354    1367    1371    1378    1393    1396    1405    1409    1438    1489
                   1567    1570    1573    1579    1590    1604    1609    1614    1617    1755    1759    1763    1824
                   1830    1836    1840    1918    1972    1976    1990    1994    2022    2101    2106    2123
HNDSHK  010614     1926    1951#   1963
HNDSH1  010622     1954#   1955
HNDSH2  010642     1959    1961#   1962
ICOUNT  012242      602*    633*    828*    847*    874*    902*   1254*   1288*   1300*   1323*   1351*   1362*   2283
                   2290#
IE    = 000100     1695#   1724    1740    1895    1896    1942    1981    2001
INBUF   001042      540#   1155    1176    1194    1214    1364    1423    1450    1470    1476    1493*   1496*   1509
                   1528    1544    1576    1585    1599    1929
INBUF1  001072      552#   1476*   1496
INCBA   002552      890#    895
INCDB   005372     1326#   1331
INCWC   002522      877#    882
INTA    007010     1157    1178    1196    1216    1425    1452    1477    1511    1530    1564#
INTB    004024     1087    1096#
INTC    004176     1119    1128#
JBCNT   007506     1712#   1717*   1861    1866*   1899*
JBFLAG  007504     1711#   1720*   1736*   1765    1770    1771*   1822    1832*   1842*
JOBAO   010164     1721    1850#   1897
JOBAOA  010244     1862    1867#
JOBAOB  010224     1863#   1864
JOBA1   010276     1870    1879#
JOBA2   010334     1883    1892#
LDEXIT  006742     1549    1552#
LENCHK  001050      543#   1545*   1547*   1548    1550    1554*   1558*   1559    1586*   1587*   1591    1600*   1601*
                   1605
LIST    012106     2202    2251#
LISTA   011330     1850    1868    1892    2131#
LISTA1  011342     1851    1879    1881    1893    2137#
LISTB   011354     1925    1927    1938    2143#
LOADA   006720     1547#   1551
LODBUF  006706     1150    1171    1190    1209    1419    1445    1471    1506    1525    1544#
MAINT = 010000     1701#
MFCHK   006416     1492    1495#
MFLOOP  006310     1477#   1494
MINUS   011704     2210    2213#
MKNUM   011734     2219#   2222
MOADD   012016     2231#   2233
MREC    010724     1882    1988#
MREC1   010736     1989    1992#
MREC2   010750     1993    1996#
MREC3   010762     1998#   1999
MSTART  001000      525#
MS1     007510      526    1716#
MXMIT   010650     1869    1970#
MXMIT1  010662     1971    1974#
MXMIT2  010674     1975    1978#
```

```
NEXCHK  004776  1229  1235#
NEXJOB  007500  1709# 1721# 1722# 1737# 1733# 1768# 1769# 1828  1832  1838  1842  1870# 1871#
                1883# 1884# 1897# 1898# 1908# 1909# 1943# 1944#
NOP   = 000240  471#
NORMAL  007144  1106  1139  1247  1282  1412  1581  1594#
NPRRDY  003732  1069  1083#
NPR1    001036   538# 1084  1086# 1100  1116  1117# 1132  1136
NWRDXF  007476  1708# 1958  2028
N1413   003716  1074  1079#
OFL     012772  2393#
OUT     012562  2307  2309  2313  2336  2353#
PASCNT  001074   553# 1626# 2278
PRINT   011366   497  1806  2156#
PRMXFR  011010  1979  1997  2009#
PRMXF1  011042  2016# 2029
PRMXF2  011046  2018# 2019
PRMXF3  011062  2021  2024#
PRMXF4  011064  2025# 2026
PRTAB   011616  2172  2177  2182  2200# 2319
PSW     001016   510#  530#  572#  903#  925#  948#  977# 1009# 1089# 1121# 1159# 1180# 1198#
                1218# 1231# 1259# 1390# 1427# 1454# 1479# 1513# 1532# 1596# 1631# 1650# 1661#
                1664# 1723# 1725# 1739# 1741# 2267#
P3INT   003452  1017  1026#
P3INV   003402  1011  1017#
P4INT   003314   987   997#
P4INV   003224   979   985#
PSERR   003142   958   967#
PSINV   003060   950   956#
P6ERR   003006   933   939#
P6INV   002752   927   933#
P7ERR   002700   911   917#
P7INV   002644   905   911#
RDSW    012260  2303#
RDYCHK  001056   546# 1372# 1375#
READY = 000200  1696#
RESALL  007766  1773  1791#
RETURN  012246   573# 2264# 2268  2288# 2292#
SAVALL  007752  1767  1780#
SAVCC   011614  2160# 2176  2198#
SAVPC   011612  2159# 2171  2197#
SAVR2   011604  2168# 2183  2194#
SAVR3   011606  2169# 2184  2195#
SAVR4   011610  2170# 2185  2196#
SCOPE = 104400   472#  581   594   609   618   632   644   657   674   691   704   717   730
                 743   756   769   827   846   860   873   887   901   924   947   976  1008
                1035  1067  1114  1148  1169  1188  1207  1226  1253  1287  1299  1309  1322
                1337  1350  1361  1385  1417  1443  1468  1502  1521  1542
SCOPEA  012120  2261#
SCOPEB  012142  2263  2266# 2277  2286
SCOPEC  012154   500  2275#
SCOPEF  012244  2283  2285# 2287# 2291#
SCOPEG  012230  2279  2282  2284  2287#
SETBF1  011160  2070# 2079
SETBF2  011164  2071# 2080
SETBUF  011154  1867  2069#
```

```
SEVEN   012074          2205*   2214    2225    2231*   2246#
SJOB1   010406          1737    1908#   1943
SJOB2   010424          1738    1909    1916#   1944
SJOB2A  010440          1917    1920#
SJOB2B  010532          1935#   1936
SJOB2C  010544          1934    1938#
SJOB2D  010570          1937    1942#
SR      001014           529#    560     564*    567     956     985     1644    2157    2187    2262    2276    2281    2306
                        2318    2352*
SSTART  001006           527#
SS1     007570           528    1733#
START   011712          2212    2214#   2234
SUSWR   001102           516     557#
SWREG   000176           507#    564     567     2306
TEMP    001076           554#    956*    957*    963     969     985*    986*    993     1000
TEMPST  012254          2301#   2322*   2323*   2344*   2345*   2346*   2348*   2352
TEMP2   001100           555#
TIB     012262          2304#   2310*   2311*   2312    2326*   2327    2330    2337    2339    2347*   2348    2362*   2366*
                        2369
TKB     001062           548#   2310    2361*   2366
TKS     001060           547#   1392*   2308    2360*   2363*   2364
TNPRO   004102          1108    1114#   1143
TNPR1   003646          1068#   1110
TOODLE  012072          2215*   2216*   2217    2245#
TPB     001066           550#   2162*   2165*   2173*   2178*   2211*   2213*   2238*   2369*   2414*
TPS     001064           549#   2163    2166    2174    2179    2203*   2207    2236    2242    2367    2405*   2412
TRPA    007406          1647    1651#
TRPB    007412          1652#   1662*
TRTRAP  007342          1633    1643#
TSTRDY  005546          1373#   1377
TTIN    012564          2325    2360#
TTIN1   012604          2364#   2365
TTIN2   012620          2367#   2368
TTOUT   012774           515    1628    2315    2317    2321    2333    2342    2401#   2415    2421
T33CLR  004074          1095    1109#
T34CLR  004246          1127    1142#
T35     004254          1141    1148#
WAIT1   011662          2207#   2208
WAIT2   012040          2236#   2237    2241
WCLEN   001054           545#   1152*   1153*   1154    1173*   1174*   1175    1191*   1192*   1193    1211*   1212*   1213
                        1420*   1421*   1422    1447*   1448*   1449    1504*   1505*   1508    1523*   1524*   1527
WGTCT   012100          2201*   2219*   2221    2226*   2248#
WRTOC   011754          2218    2223#
XBA16 = 000020          1693#
XBA17 = 000040          1694#
XCHKBU  015104           541    2430#
XINBUF  014102           540    2131    2143    2428#
XLIST   012032          2229    2235#
X1      002712           916     924#
X2      003020           938     947#
X3      003164           966     970     976#
X4      003342           996    1001    1008#
X5      003472          1025    1035#
YESRT   007472          1659    1669#
YESTR   007414          1645    1657#
```

```
YESTR2  007470            1649    1658*   1668#
$CNTG   012636            2314    2372#
$CRLF   012644            2332    2373#
$ENDAD  007332             503    1635#
$ENPAS  012677            1627    2380#
$HD   = 000003             460     461
$MNEW   012660            2320    2376#
$MSWR   012650            2316    2374#
$QUEST  012671            2341    2378#
$READ   012372            2323#
$SWR  = 160000             460     461#
$TITLE  012715             513    2383#
$TN   = 000001             460#
.     = 015106             495#    496#    499#    502#    504#    506#    508#    517#    591     607     623     636     647
                           660     664     677     681     694     698     707     711     720     724     733     737     746
                           750     759     763     773     776     779     782     785     788     791     794     798     801
                           804     807     810     814     817     820     834     840     850     854     863     867     878
                           891     909     931     954     983    1015    1038    1042    1045    1050    1053    1058    1061
                          1071    1077    1081    1098    1101    1104    1130    1133    1137    1161    1163    1182    1200
                          1202    1220    1237    1240    1243    1266    1269    1273    1276    1293    1303    1312    1316
                          1327    1341    1344    1353    1366    1370    1376    1395    1408    1434    1435    1437    1461
                          1462    1488    1515    1539    1540    1560    1566    1569    1572    1578    1589    1603    1608
                          1613    1616    1625    1663    1754    1758    1762    1839    2164    2167    2175    2180    2188
                          2191    2243    2391#   2424#   2426#   2428    2429#   2430
.EMPTY  013020            2404    2408#
.REST   013064            2411    2420#
.RET    013050            2409    2416#   2419
.RETR   013072            2418    2423#
```

H05

```
MAINDEC-11-DZDRB-F       MACY11 30(1046)  25-OCT-77  12:36  PAGE 61
DZDRBF.P11     25-OCT-77 12:35            CROSS REFERENCE TABLE -- MACRO NAMES                                    SEQ 0059

STARS      448#    462     468     520     522     576     578     597     599     613     615     627     629     639     641
           652     654     669     671     686     688     701     703     714     716     727     729     740     742     753
           755     766     768     823     826     843     845     857     859     870     872     884     886     898     900
           921     923     944     946     973     975    1005    1007    1032    1034    1064    1066    1111    1113    1145
          1147    1166    1168    1185    1187    1204    1206    1223    1225    1249    1252    1284    1286    1296    1298
          1306    1308    1319    1321    1333    1336    1347    1349    1358    1360    1380    1384    1414    1416    1440
          1442    1465    1467    1499    1501    1518    1520    1620    1622    1639    1641    1654    1656    1673    1675
          1713    1715    1729    1731    1743    1745    1776    1778    1787    1789    1799    1801    1817    1820    1845
          1849    1874    1877    1887    1890    1902    1906    1912    1914    1947    1949    1965    1968    1984    1987
          2004    2007    2032    2035    2049    2052    2064    2067    2085    2089    2111    2114    2150    2153    2256
          2258    2270    2272    2297    2300    2354    2356    2396    2398
.HEADE     448#    450

. ABS.   015106     000

 ERRORS DETECTED:  0

 DZDRBF.BIN,DZDRBF.LST/CRF/SOL/NL:TOC=DZDRBF.P11
 RUN-TIME: 4 6 .7 SECONDS
 RUN-TIME RATIO: 50/11=4.4
 CORE USED:  7K  (13 PAGES)
```