DR11B

DIAGNOSTIC

MD-11-DZDRB-D

EP-DZDRB-D-DL-A

FICHE 1 OF 1

NOV 1976

digital

MADE IN USA

```
.REM    %
```

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZDRB-D
PRODUCT NAME:	DR11B - PDP11 GENERAL NPR INTERFACE DA11B - PDP11 INTERPROCESSER LINK
DATE CREATED:	APRIL 1971
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	LARRY CONDON, DICK JONES, STEVE POMFRET
REVISED BY:	W.F.KELLICKER 29-JAN-1974 ALAN BOSTICK 20-JUN-1976

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.

4.2 STARTING ADDRESS OR ADDRESSES

(A) 200 = TEST OF LOGIC USING MAINTENANCE FEATURE M9&8 IN 004,004

4.3 PROGRAM AND OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY.
LOAD STARTING ADDRESS
PRESS START.
THE PROGRAM WILL LOOP, BELL WILL RING ONCE
PER PASS 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. (BELL
WILL RING 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

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
      WILL BE ALLOWED)

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 THAT IT IS EQUAL TO ZERO. THE CORRECT CONTENTS

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 ENTERE. 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 THE LOCATION COUNTER WHEN THE TRAP OR INTERRUPT OCCURRED.

5.3 PROGRAM AND/OR OPERATOR ACTION

5.3.1 LOADING AND STARTING AT 200 ITH ALL SWITCHES DOWN IS THE INSTRUCTION AND LOGIC TEST. IF AN EPROR 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.

9. MISCELLANEOUS

9.1 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-i IN DRBA BE SET
FNCT1 SET & CLEARED
FNCT2 SET & CLEARED
FNCT3 SET & CLEARED
XBA16 SET & CLEARED
XBA17 SET & CLEARED
IE SET & CLEARED
CYCLE 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
                                        BADD READS AS 0
                                        1 DATI NPR
                                        1 DATO NPR
                                        BAOF FORCES ERROR & IS CLEARED BY CLEARING DRBA OR RESET
                                        GO CLEARS RDY
                                        DATO TO DIODE MEM CAUSES NEX
                                        DO WITHOUT CLEARING PREVIOUS ERROR CAUSES ANOTHER INT.
                                        10 DATI'S (BURST)
                                        10 DATO'S (BURST)
                                        200 DATI'S (BURST)
                                        200 DATO'S (BURST)
                                        200 DATI'S (NON-BURST)
                                        200 DATO'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
             COMUPTER THAT WILL BE THE SLAVE AND ANOTHER
             FOR THE COMPUTER THAT WILL BE THE MASTER.

        12.2 SLAVE COMPUTER, LOAD ADDRESS 1002 WITH THE HALT KEY
             DOWN AND PRESS START.

        12.3 MASTER COMPUTER, LOAD ADDRESS 1000 WITH THE HALT KEY
             DOWN AND PRESS START.
```

12.4 SLAVE COMPUTER. PUT THE HALT KEY UP AND PRESS
CONTINUE.

12.5 MASTER COMPUTER,PUT THE HALT KEY PU AND PRESS
CONTINUE.

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 COMPLTER STARTS BY ENTERING A BACKGROUND
TO WAIT FOR AN INTERJPT 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
ERROR OCCURS.

```
                                        %
                                                .ABS
                                                .MCALL .HEADER,STARS
                                        ;;**************************************************************
                                        ;;**************************************************************
                                        ;TITLE  MAINDEC-11-DZDRB-D
                                        ;*COPYRIGHT (C) 1971,1976
                                        ;*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-C2), SEPT 14, 1976.
                                        ;*
000000:                                 $TN=1
160000                                  $SWR=160000     ;;HALT ON ERROR, LOOP ON TEST, INHIBIT ERROR TYPOUT
                                        ;;**************************************************************
                                        ;       REVISED BY ALAN BOSTICK JUNE 1976
                                        ;       MODIFIED FOR SOFTWARE SWITCH REGISTER
                                        ;       INCLUDING DYNAMIC LOADING OF SWR
                                        ;;**************************************************************
                                        ;;**************************************************************

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

                                                BUSERR=000004

                                        ;LOAD TRAP CATCHER INTO 0 THRU 777.

                                                .=0
                                                .=30
000030  011072                                  PRINT
000032  000340                                  340
```

```
                    000034                          .=34
000034  011650                                      SCOPEC
000036  000340                                      340
                    000176                          .=176
000176  000000                                      SWREG:  0
                    000200                          .=200
000200  012706  013566                              MOV     #BUFF,%6        ;SET UP STACK LIMIT
000204  005077  000604                              CLR     @PSW
000210  005002                                      CLR     %2
000212  012702  012433                              MOV     #$HEAD,%2
000216  004767  012240                              JSR     %7,TTOUT
000222  012702  012403                              MOV     #$MAIN,%2
000226  004767  012230                              JSR     %7,TTOUT
000232  000167  000634                              JMP     SUSWR
                    001000                          .=1000


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

001000  000402                                  MSTART: BR      MSX             ;MASTER START
001002  000167  006276                          SSTART: JMP     SSI             ;SLAVE START
001006  000167  006212                          MSX:    JMP     MSI
001012  177570                                  SR:     177570
001014  177776                                  PSW:    177776
001016  172410                                  DRWC:   172410
001020  172412                                  DRBA:   172412
001022  172414                                  DRST:   172414
001024  172416                                  DRDB:   172416
001026  000126                                  DRVS:   126
001030  000240                                  DRINL:  240
001032  000124                                  DRINV:  124
001034  052525                                  NPR1:   52525
001036  173000                                  DIOMEM: 173000
001040  013570                                  INBUF:  XINBUF
001042  014572                                  CHKBUF: XCHKBU
001044  000000                                  BUFLEN: HALT
001046  000000                                  LENCHK: HALT
001050  000000                                  BRWAIT: HALT
001052  000000                                  WCLEN:  HALT
001054  000000                                  RDYCHK: HALT
001056  177560                                  TKS:    177560
001060  177562                                  TKB:    177562
001062  177564                                  TPS:    177564
001064  177566                                  TPB:    177566
001066  000000                                  FNCCNT: HALT
001070  000000                                  INBUF1: HALT

001072  013746  000006                          SUSWR:  MOV     @#6,-(SP)       ;SAVE VECTORS
001076  013746  000004                                  MOV     @#4,-(SP)
001102  012737  001122  000004                          MOV     #64$,@#4        ;SET UP FOR TIMEOUT
001110  022777  177777  177574                          CMP     #-1,@SR         ;REFERENCE HARDWARE SWITCH REGISTER
001116  001402                                        BEQ     65$
001120  000404                                        BR      66$
```

```
546  001122  022626                        64$:    CMP     (SP)+,(SP)+     ;ADJUST STACK
547  001124  012767  000176  177660        65$:    MOV     #SWREG,SR       ;POINT TO SOFTWARE SWITCH REG
548  001132  012637  000004                66$:    MOV     (SP)+,@#4       ;RESTORE VECTORS
549  001136  012637  000006                        MOV     (SP)+,@#6
550  001142  022767  000176  177642                CMP     #SWREG,SR       ;IS S.WREG USED
551  001150  001002                                BNE     BEGIN
552  001152  004767  010646                        JSR     PC,CNTLU        ;ALLOW S.WREG TO BE LOADED
553  001156  012777  000340  177630        BEGIN:  MOV     #340,@PSW       ;PROC. AT LEVEL #7
554  001164  012767  001156  010542                MOV     #BEGIN,RETURN
555
556
557
558                                          ;;**************************************************
559                                          ;       TEST 0 CAN ALL DR11-B REG BE ADDRESSED WITHOUT ERROR?
560                                          ;;**************************************************
561
562  001172  104400                                SCOPE
563  001174  012767  001234  176602                MOV     #ERRA,@BUSERR   ;BUS ERROR VECTOR TO ERRA
564  001202  010700                                MOV     %7,%0           ;PC TO R0
565  001204  005277  177606                        INC     @DRWC           ;ADDRESS DRWC
566  001210  010700                                MOV     %7,%0           ;PC TO R0
567  001212  005277  177602                        INC     @DRBA           ;ADDRESS DRBA
568  001216  010700                                MOV     %7,%0           ;PC TO R0
569  001220  005077  177576                        CLR     @DRST           ;ADDRESS DRST
570  001224  010700                                MOV     %7,%0           ;PC TO R0
571  001226  005277  177572                        INC     @DRDB           ;ADDRESS DRDB
572  001232  000401                                BR      .+4             ;MADE IT - BRANCH OVER HALT
573  001234  104000                        ERRA:   HLT                     ;BUS ERROR, R0 HAS PC OF ERROR
574  001236  012767  000006  176540                MOV     #6,BUSERR       ;RESTORE #6 TO BUS ERROR VECTOR
575  001244  104400                                SCOPE
576
577
578                                          ;;**************************************************
579                                          ;       TEST 1 DOES RESET CLEAR DRWC?
580                                          ;;**************************************************
581
582
583  001246  012767  000010  010454                MOV     #10,ICOUNT
584  001254  012777  177777  177534                MOV     #-1,@DRWC       ;ALL ONES TO DRWC
585  001262  004767  010464                        JSR     %7,CKSWR
586  001266  000005                                RESET                   ;INIT
587  001270  005777  177522                        TST     @DRWC           ;LOOKING FOR Z-BIT TO SET
588  001274  001401                                BEQ     .+4             ;DID DRWC GET CLEARED?
589  001276  104000                                HLT                     ;DRWC NOT CLEAR
590  001300  104400                                SCOPE
591
592
593
594                                          ;;**************************************************
595                                          ;       TEST2 DOES RESET CLEAR DRBA?
596                                          ;;**************************************************
597
598
599  001302  104400                                SCOPE
600  001304  012777  177777  177506                MOV     #-1,@DRBA       ;ALL ONES TO DRBA
601  001312  004767  010434                        JSR     %7,CKSWR
```

```
001316  000005                  RESET                   ;INIT
001320  005777  177474          TST     @DRBA           ;LOOKING FOR Z-BIT TO SET
001324  001401                  BEQ     .+4             ;DID DRBA GET CLEARED?
001326  104000                  HLT                     ;DRBA NOT CLEAR


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

001330  104400                  SCOPE
001332  012767  004000  010370  MOV     #4000,ICOUNT
001340  012777  177777  177450  MOV     #-1,@DRWC       ;SET ALL BITS IN DRWC
001346  022777  177777  177442  CMP     #-1,@DRWC       ;LOOKING FOR Z-BIT TO SET
001354  001401                  BEQ     .+4             ;SEE IF ALL BITS GOT SET
001356  104000                  HLT                     ;ALL BITS AREN'T SET


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

001360  104400                  SCOPE
001362  012777  177776  177430  MOV     #-2,@DRBA       ;SET BITS 15-01 IN DRBA
001370  022777  177776  177422  CMP     #-2,@DRBA       ;LOOKING FOR Z-BIT TO SET
001376  001401                  BEQ     .+4             ;SEE IF BITS 15-01 GOT SET
001400  104000                  HLT                     ;BITS 15-01 AREN'T SET


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

001402  104400                  SCOPE
001404  052777  000002  177410  BIS     #BIT1,@DRST     ;SET FNCT1
001412  032777  000002  177402  BIT     #BIT1,@DRST     ;TEST FNCT1
001420  001001                  BNE     .+4             ;IS IT SET?
001422  104000                  HLT                     ;FNCT1 IS CLEAR
001424  042777  000002  177370  BIC     #BIT1,@DRST     ;CLEAR FNCT1
001432  032777  000002  177362  BIT     #BIT1,@DRST     ;TEST FNCT1
001440  001401                  BEQ     .+4             ;WAS IT CLEAR
001442  104000                  HLT                     ;FNCT1 WAS SET


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

001444  104400                  SCOPE
001446  052777  000004  177346  BIS     #BIT2,@DRST     ;SET FNCT2
001454  032777  000004  177340  BIT     #BIT2,@DRST     ;TEST FNCT2
```

```
001462  001001                  BNE     .+4             ;IS IT SET?
001464  104000                  HLT                     ;FNCT2 IS CLEAR
001466  042777  000004  177326   BIC     #BIT2,@DRST     ;CLEAR FNCT2
001474  032777  000004  177320   BIT     #BIT2,@DRST     ;TEST FNCT2
001502  001401                  BEQ     .+4             ;WAS IT CLEAR?
001504  104000                  HLT                     ;FNCT2 WAS SET


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

001506  104400                  SCOPE
001510  052777  000010  177304   BIS     #BIT3,@DRST     ;SET FNCT3
001516  032777  000010  177276   BIT     #BIT3,@DRST     ;TEST FNCT3
001524  001001                  BNE     .+4             ;IS IT SET?
001526  104000                  HLT                     ;FNCT3 IS CLEAR
001530  042777  000010  177264   BIC     #BIT3,@DRST     ;CLEAR FNCT3
001536  032777  000010  177256   BIT     #BIT3,@DRST     ;TEST FNCT3
001544  001401                  BEQ     .+4             ;WAS IT CLEAR?
001546  104000                  HLT                     ;FNCT3 WAS SET

                        ;;**************************************************************
                        ;       TEST11 TEST THAT XBA16 CAN BE SET AND CLEARED
                        ;;**************************************************************
001550  104400                  SCOPE
001552  052777  000020  177242   BIS     #BIT4,@DRST     ;SET XBA16
001560  032777  000020  177234   BIT     #BIT4,@DRST     ;TEST XBA16
001566  001001                  BNE     .+4             ;IS IT SET?
001570  104000                  HLT                     ;XBA16 IS CLEAR
001572  042777  000020  177222   BIC     #BIT4,@DRST     ;CLEAR XBA16
001600  032777  000020  177214   BIT     #BIT4,@DRST     ;TEST XBA16
001606  001401                  BEQ     .+4             ;IS IT CLEAR
001610  104000                  HLT                     ;XBA16 WAS SET

                        ;;**************************************************************
                        ;       TEST12 TEST THAT XBA17 CAN BE SET AND CLEARED
                        ;;**************************************************************
001612  104400                  SCOPE
001614  052777  000040  177200   BIS     #BIT5,@DRST     ;SET XBA17
001622  032777  000040  177172   BIT     #BIT5,@DRST     ;TEST XBA17
001630  001001                  BNE     .+4             ;IS IT SET?
001632  104000                  HLT                     ;XBA17 IS CLEAR
001634  042777  000020  177160   BIC     #BIT4,@DRST     ;CLEAR XBA17
001642  032777  000020  177152   BIT     #BIT4,@DRST     ;TEST XBA17
001650  001401                  BEQ     .+4             ;IS IT CLEAR?
001652  104000                  HLT                     ;XBA17 WAS SET

                        ;;**************************************************************
                        ;       TEST13 TEST THAT IE CAN BE SET AND CLEARED
                        ;;**************************************************************
001654  104400                  SCOPE
001656  052777  000100  177136   BIS     #BIT6,@DRST     ;SET IE
001664  032777  000100  177130   BIT     #BIT6,@DRST     ;TEST IE
```

```
                                BNE     .+4             ;IS IT SET?
                                                        ;IE IS CLEAR
                                BIS     #BIT6,@DRST     ;CLEAR IE
                                BIT     #BIT6,@DRST     ;TEST IE
                                BEQ     .+4             ;IS IT CLEAR?
                                HLT                     ;IE WAS SET

                        ;;**************************************************************
                        ;       TEST14 TEST THAT CYCLE CAN BE SET AND CLEARED
                        ;;**************************************************************
                                SCOPE
                                BIS     #BIT8,@DRST     ;SET CYCLE
                                BIT     #BIT8,@DRST     ;TEST CYCLE
                                BNE     .+4             ;IS IT SET?
                                                        ;CYCLE WAS CLEAR
                                BIC     #BIT8,@DRST     ;CLEAR CYCLE
                                BIT     #BIT8,@DRST     ;TEST CYCLE
                                BEQ     .+4             ;IS IT CLEAR?
                                HLT                     ;CYCLE WAS SET

                        ;;**************************************************************
                        ;       TEST15 TEST THAT MAINT CAN BE SET AND CLEARED
                        ;;**************************************************************
                                SCOPE
                                BIS     #BIT12,@DRST    ;SET MAINT
                                BIT     #BIT12,@DRST    ;TEST MAINT
                                BNE     .+4             ;IS IT SET?
                                HLT                     ;MAINT WAS CLEAR
                                BIC     #BIT12,@DRST    ;CLEAR MAINT
                                BIT     #BIT12,@DRST    ;TEST MAINT
                                BEQ     .+4             ;IS MAINT CLEAR?
                                HLT                     ;MAINT WAS SET

                        ;;**************************************************************
                        ;       TEST 16 TEST THAT ALL DRST R/W BITS CAN BE SET AND CLEARED
                        ;;**************************************************************
                                SCOPE
                                BIS     #10576,@DRST    ;SET FOLLOWING: MAINT(12), CYCLE(08), IE(06), XBA17(05),
                                                        ;               XBA16(04), FNCT3(03), FNCT2(02), FNCT1(01)
                                BIT     #BIT1,@DRST     ;TEST FNCT1
                                BNE     .+4             ;IS IT SET?
                                HLT                     ;FNCT1 IS CLEAR
                                BIT     #BIT2,@DRST     ;TEST FNCT2
                                BNE     .+4             ;IS IT SET?
                                HLT                     ;FNCT2 IS CLEAR
                                BIT     #BIT3,@DRST     ;TEST FNCT3
                                BNE     .+4             ;IS IT SET?
                                HLT                     ;FNCT3 IS CLEAR
                                BIT     #BIT4,@DRST     ;TEST XBA16
                                BNE     .+4             ;IS IT SET?
                                HLT                     ;XBA16 IS CLEAR
                                BIT     #BIT5,@DRST     ;TEST XBA17
                                BNE     .+4             ;IS IT SET?
                                HLT                     ;XBA17 IS CLEAR
                                BIT     #BIT6,@DRST     ;TEST IE
                                BNE     .+4             ;IS IT SET?
```

```
002312  104000                  HLT                 ;IE IS CLEAR
002314  032777  000400  176666  BIT     #BIT8,@DRST ;TEST CYCLE
002322  001001                  BNE     .+4         ;IS CYCLE SET?
002324  104000                  HLT                 ;CYCLE IS CLEAR
002326  032777  010000  176654  BIT     #BIT12,@DRST ;TEST MAINT
002334  001001                  BNE     .+4         ;IS MAINT SET?
002336  104000                  HLT                 ;MAINT IS CLEAR
002340  042777  010576  176642  BIC     #10576,@DRST ;CLEAR ALL R/W BITS IN DRST
002346  032777  000002  176634  BIT     #BIT1,@DRST ;TEST FNCT1
002354  001401                  BEQ     .+4         ;IS FNCT1 CLEAR?
002356  104000                  HLT                 ;FNCT1 IS SET
002360  032777  000004  176622  BIT     #BIT2,@DRST ;TEST FNCT2
002366  001401                  BEQ     .+4         ;IS FNCT2 CLEAR?
002370  104000                  HLT                 ;FNCT2 IS SET
002372  032777  000010  176610  BIT     #BIT3,@DRST ;TEST FNCT3
002400  001401                  BEQ     .+4         ;IS FNCT3 CLEAR?
002402  104000                  HLT                 ;FNCT3 IS SET
002404  032777  000020  176576  BIT     #BIT4,@DRST ;TEST XBA16
002412  001401                  BEQ     .+4         ;IS XBA16 CLEAR
002414  104000                  HLT                 ;XBA16 IS SET
002416  032777  000040  176564  BIT     #BIT5,@DRST ;TEST XBA17
002424  001401                  BEQ     .+4         ;IS XBA17 CLEAR?
002426  104000                  HLT                 ;XBA17 IS SET

002430  032777  000100  176552  BIT     #BIT6,@DRST ;TEST IE
002436  001401                  BEQ     .+4         ;IS IE CLEAR?
002440  104000                  HLT                 ;IE IS SET
002442  032777  000400  176540  BIT     #BIT8,@DRST ;TEST CYCLE
002450  001401                  BEQ     .+4         ;IS CYCLE CLEAR?
002452  104000                  HLT                 ;CYCLE IS SET
002454  032777  010000  176526  BIT     #BIT12,@DRST ;TEST MAINT
002462  001401                  BEQ     .+4         ;IS MAINT CLEAR?
002464  104000                  HLT                 ;MAINT IS SET

                        ;;**************************************************************
                        ;       TEST17 ALL R/W BITS IN DRST CAN BE SET AND RESET TO ZERO. THAT READY
                        ;       IS SET, NEX IS CLEAR, AND GO IS READ AS A 0.
                        ;;**************************************************************
002466  104400                  SCOPE
002470  012767  000010  007420  MOV     #10,ICOUNT
002476  052777  010576  176504  BIS     #10576,@DRST    ;SET FOLLOWING: MAINT(12),CYCLE(08),IE(06),XBA17(05),
                                                        ;               XBA16(04),FNCT3(03),FNCT2(02),FNCT1(01)
002504  017701  176500          MOV     @DRST,R1        ;MOVE (DRST) TO R1
002510  052701  167201          BIS     #167201,R1      ;SETS BITS IN R1 THAT WERE NOT SET IN DRST
002514  005201                  INC     R1              ;R1 SHOULD GO FROM -1 TO ZERO
002516  001401                  BEQ     .+4             ;WERE ALL DRST R/W BITS SET?
002520  104000                  HLT                     ;NOT ALL BITS WERE SET
002522  004767  007412          JSR     R7,CKSWR
002526  000005                  RESET                   ;CLEAR ALL DRST R/W BITS
002530  017701  176454          MOV     @DRST,R1        ;MOVE (DRST) TO R1
002534  042701  127200          BIC     #127200,R1      ;CLEAR ALL BITS EXCEPT R/W BITS, NEX, AND GO
002540  001401                  BEQ     .+4             ;SHOULD EQUAL ZERO
002542  104000                  HLT                     ;RESET DIDN'T LEAVE DRST AS IT SHOULD HAVE

                        ;;**************************************************************
                        ;       TEST20 CAN DRWC HOLD ALTERNATE ONE'S AND ZERO'S
```

```
                                        ;;*****************************************************************
002356  104400                                SCOPE
002360  012767  004000  007342                MOV     #4000,ICOUNT
002366  012777  052525  176422                MOV     #052525,@DRWC   ;ALT 0'S AND 1'S TO DRWC
002374  022777  052525  176414                CMP     #052525,@DRWC   ;LOOKING FOR Z-BIT TO SET
002402  001401                                BEQ     .+4             ;DOES DRWC HAVE THE CORRECT PATTERN?
002404  104000                                HLT                     ;DRWC DOESN'T HAVE THE CORRECT PATTERN
002406  012777  125252  176402                MOV     #125252,@DRWC   ;ALT 1'S AND 0'S TO DRWC
002414  022777  125252  176374                CMP     #125252,@DRWC   ;LOOKING FOR Z-BIT TO SET
002422  001401                                BEQ     .+4             ;DOES DRWC HAVE THE CORRECT PATTERN?
002424  104000                                HLT                     ;DRWC DOESN'T HAVE THE CORRECT PATTERN

                                        ;;*****************************************************************
                                        ;       TEST21 CAN DRBA HOLD ALTERNATE ONE'S AND ZERO'S
                                        ;;*****************************************************************
002426  104400                                SCOPE
002430  012777  052524  176362                MOV     #052524,@DRBA   ;ALT 0'S AND 1'S TO DRBA
002436  022777  052524  176354                CMP     #052524,@DRBA   ;LOOKING FOR Z-BIT TO SET
002444  001401                                BEQ     .+4             ;DOES DRBA HAVE THE CORRECT PATTERN?
002446  104000                                HLT                     ;DRBA DOESN'T HAVE THE CORRECT PATTERN
002450  012777  125252  176342                MOV     #125252,@DRBA   ;ALT 1'S AND 0'S TO DRBA
002456  022777  125252  176334                CMP     #125252,@DRBA   ;LOOKING FOR Z-BIT TO SET
002464  001401                                BEQ     .+4             ;DOES DRBA HAVE THE CORRECT PATTERN?
002466  104000                                HLT                     ;DRBA DOESN'T HAVE THE CORRECT PATTERN

                                        ;;*****************************************************************
                                        ;       TEST22 INCREMENTING PATTERN TO WRAP-AROUND IN DRWC
                                        ;;*****************************************************************
002470  104400                                SCOPE
002472  005067  007232                        CLR     ICOUNT
002476  005001                                CLR     %1              ;SET-UP
002500  005077  176312                        CLR     @DRWC           ;SET-UP
002504  020177  176306            INCWC:      CMP     %1,@DRWC        ;SEE IF THEY ARE EQUAL
002510  001401                                BEQ     .+4             ;ARE THEY EQUAL?
002512  104000                                HLT                     ;THEY'RE NOT EQUAL
002514  005277  176276                        INC     @DRWC           ;GET NEXT NUMBER
002520  005201                                INC     %1              ;GET NEXT NUMBER
002522  001370                                BNE     INCWC           ;DONE WITH TEST?  IF NOT CONTINUE

                                        ;;*****************************************************************
                                        ;       TEST23 INCREMENTING PATTERN TO WRAP-AROUND IN DRBA
                                        ;;*****************************************************************
002524  104400                                SCOPE
002526  005001                                CLR     %1              ;SET-UP
002530  005077  176264                        CLR     @DRBA           ;SET-UP
002534  020177  176260            INCBA:      CMP     %1,@DRBA        ;SEE IF THEY ARE EQUAL
002540  001401                                BEQ     .+4             ;ARE THEY EQUAL?
002542  104000                                HLT                     ;THEY'RE NOT EQUAL
002544  062777  000002  176246                ADD     #2,@DRBA        ;GET NEXT NUMBER
002552  062701  000002                        ADD     #2,%1           ;GET NEXT NUMBER
002556  001356                                BNE     INCBA           ;DONE WITH TEST?  IF NOT CONTINUE


                                        ;;*****************************************************************
                                        ;       TEST25 TEST THAT DR11-B DOES NOT INTERRUPT WITH PROC AT LEVEL 7
                                        ;;*****************************************************************
```

```
                                                SCOPE
002560  104400
002562  012767  000340  007140                  MOV     #340,@PSW       ;STATUS AT LEVEL 7
002566  032777  000200  176216                  BIT     #BIT7,@DRST     ;CHECK READY BIT
002574  001010                                  BNE     P7INV           ;IS IT SET
002576  004767  007140                          JSR     %7,CKSWR
002602  000005                                  RESET                   ;INIT TO SET READY
002604  032777  000200  176200                  BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
002612  001001                                  BNE     .+4             ;IS READY SET?
002614  104000                                  HLT                     ;READY CAN'T BE SET BY INIT
002616  012777  002654  176176  P7INV:  MOV     #P7ERR,@DRINV   ;SET UP INT VECTOR
002624  052777  000100  176160                  BIS     #BIT6,@DRST     ;SET IE
002632  000240                                  NOP
002634  042777  000100  176150                  BIC     #BIT6,@DRST     ;DR11-B DIDN'T INTERRUPT - CLEAR IE
002642  000401                                  BR      .+4
002644  104000          P7ERR:  HLT                     ;DR11-B INTERRUPTED, BUT IT SHOULDN'T HAVE

                        ;;*************************************************************
                        ;       TEST26 TEST THAT DR11-B DOES NOT INTERRUPT WITH PROC AT LEVEL 6
                        ;;*************************************************************
                                                SCOPE
002646  104400
002650  012777  000300  176126                  MOV     #300,@PSW       ;STATUS AT LEVEL 6
002656  032777  000200  176126                  BIT     #BIT7,@DRST     ;CHECK READY BIT
002664  001010                                  BNE     P6INV           ;IS IT SET?
002666  004767  007052                          JSR     %7,CKSWR
002672  000005                                  RESET                   ;INIT TO SET READY
002674  032777  000200  176110                  BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
002702  001001                                  BNE     .+4             ;IS READY SET?
002704  104000                                  HLT                     ;READY CAN'T BE SET BY INIT
002706  012777  002744  176106  P6INV:  MOV     #P6ERR,@DRINV   ;SET UP INT VECTOR
002714  052777  000100  176070                  BIS     #BIT6,@DRST     ;SET IE
002722  000240                                  NOP
002724  042777  000100  176060                  BIC     #BIT6,@DRST     ;DR11-B DIDN'T INTERRUPT - CLEAR IE
002732  000401                                  BR      .+4
002734  104000          P6ERR:  HLT                     ;DR11-B INTERRUPTED, BUT IT SHOULDN'T HAVE


                        ;;*************************************************************
                        ;       TEST27 TEST THAT DR11-B DOES NOT INTERRUPT WITH PROC AT LEVEL 5
                        ;;*************************************************************
                                                SCOPE
002736  104400
002740  012777  000240  176036                  MOV     #240,@PSW       ;STATUS AT LEVEL 5
002746  032777  000200  176036                  BIT     #BIT7,@DRST     ;CHECK READY BIT
002754  001010                                  BNE     P5INV           ;IS IT SET?
002756  004767  006760                          JSR     %7,CKSWR
002762  000005                                  RESET                   ;INIT TO SET READY
002764  032777  000200  176020                  BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
002772  001001                                  BNE     .+4             ;IS IT SET?
002774  104000                                  HLT                     ;RDY CAN'T BE SET BY INIT
002776  012777  003034  176016  P5INV:  MOV     #P5ERR,@DRINV   ;SET UP INT VECTOR
003004  052777  000100  176000                  BIS     #BIT6,@DRST     ;SET IE
003012  000240                                  NOP
003014  042777  000100  175770                  BIC     #BIT6,@DRST     ;DR11-B DIDN'T INTERRUPT - CLEAR IE
003022  000401                                  BR      .+4
003024  104000          P5ERR:  HLT                     ;DR11-B INTERRUPTED, BUT IT SHOULDN'T HAVE
```

```
                                        ;;*****************************************************************
                                        ;       TEST30 TEST THAT DR11-B DOES INTERRUPT WITH PROC AT LEVEL 4
                                        ;;*****************************************************************
003036  104400                                  SCOPE
003040  012777  000200  175746                  MOV     #200,@PSW       ;STATUS AT LEVEL 4
003046  032777  000200  175746                  BIT     #BIT7,@DRST     ;CHECK READY BIT
003054  001010                                  BNE     P4INV           ;IS IT SET?
003056  004767  006670                          JSR     %7,CKSWR
003062  000005                                  RESET                   ;INIT TO SET READY
003064  032777  000200  175730                  BIT     #BIT7,@DRST     ;SEE IF READY IS SET NOW
003072  001001                                  BNE     .+4             ;IS IT SET
003074  104000                                  HLT                     ;READY CAN'T BE SET BY INIT
003076  012777  003116  175726  P4INV:  MOV     #P4INT,@DRINV   ;SET UP INT VECTOR
003104  052777  000100  175710          BIS     #BIT6,@DRST     ;SET IE
003112  000240                                  NOP
003114  104000                                  HLT                     ;DR11-B DIDN'T INTERRUPT
003116  005077  175700          P4INT:  CLR     @DRST           ;CLEAR IE
003122  022626                                  CMP     (%6)+,(%6)+     ;REPOSITION THE STACK AFTER AN INTERRUPT
003124  012777  000126  175700                  MOV     #126,@DRINV     ;RESTORE INTERRUPT VECTOR


                                        ;;*****************************************************************
                                        ;       TEST31 TEST THAT FNCT BITS CONTROL DSTAT BITS (M968 MUST BE USED IN USER SLOTS)
                                        ;;*****************************************************************
003132  104400                                  SCOPE
003134  005077  175662                          CLR     @DRST           ;CLEAR FUNCTION BITS
003140  032777  000016  175654                  BIT     #16.,@DRST      ;CHECK FUNCTION BITS
003146  001401                                  BEQ     .+4             ;FUNCTION BITS CLEAR?
003150  104000                                  HLT                     ;FUNCTION BITS NOT CLEAR
003152  052777  000002  175642                  BIS     #BIT1,@DRST     ;SET FNCT1
003160  032777  001000  175634                  BIT     #BIT9,@DRST     ;CHECK DSTAT C
003166  001001                                  BNE     .+4             ;IS IT SET?
003170  104000                                  HLT                     ;DSTAT C IS CLEAR
003172  032777  006000  175622                  BIT     #6000,@DRST     ;CHECK THAT DSTAT A AND DSTAT B ARE CLEAR
003200  001401                                  BEQ     .+4             ;ARE THEY CLEAR?
003202  104000                                  HLT                     ;DSTAT A AND/OR DSTAT B IS SET
003204  005077  175612                          CLR     @DRST           ;CLEAR DRST
003210  052777  000004  175604                  BIS     #BIT2,@DRST     ;SET FNCT2
003216  032777  002000  175576                  BIT     #BIT10,@DRST    ;CHECK DSTAT B
003224  001001                                  BNE     .+4             ;IS IT SET?
003226  104000                                  HLT                     ;DSTAT B IS CLEAR
003230  032777  005000  175564                  BIT     #5000,@DRST     ;CHECK THAT DSTAT A AND DSTAT C ARE CLEAR
003236  001401                                  BEQ     .+4             ;ARE THEY CLEAR?
003240  104000                                  HLT                     ;DSTAT A AND/OR DSTAT B IS SET
003242  005077  175554                          CLR     @DRST           ;CLEAR DRST
003246  052777  000010  175546                  BIS     #BIT3,@DRST     ;SET FNCT3
003254  032777  004000  175540                  BIT     #BIT11,@DRST    ;CHECK DSTAT A
003262  001001                                  BNE     .+4             ;IS IT SET?
003264  104000                                  HLT                     ;DSTAT A IS CLEAR
003266  032777  003000  175526                  BIT     #3000,@DRST     ;CHECK THAT DSTAT B AND DSTAT C ARE CLEAR
003274  001401                                  BEQ     .+4             ;ARE THEY CLEAR?
003276  104000                                  HLT                     ;DSTAT B AND/OR DSTAT C IS SET
003300  005077  175516                          CLR     @DRST           ;CLR DRST
                                        ;;*****************************************************************
                                        ;       TEST 33 TEST FOR 1 DATI NPR TRANSFER (WITH M968 IN USER SLOTS)
                                        ;;*****************************************************************
```

```
                                                SCOPE
003304  104400                                  
003306  005777  175510          TNPR1:  TST     @DRST           ;CHECK ERROR BIT
003312  100027                          BPL     NPRRDY          ;IS IT CLEAR?
003314  032777  020000  175500          BIT     #BIT13,@DRST    ;CHECK ATTN
003322  001401                          BEQ     .+4             ;IS ATTN CLEAR
003324  104000                          HLT                     ;ATTN IS SET
003326  032777  040000  175466          BIT     #BIT14,@DRST    ;CHECK NEX
003334  001410                          BEQ     N1413           ;IS NEX CLEAR?
003336  042777  040000  175456          BIC     #BIT14,@DRST    ;TRY TO CLEAR NEX
003344  032777  040000  175450          BIT     #BIT14,@DRST    ;CHECK AGAIN
003352  001401                          BEQ     .+4             ;NEX STILL SET
003354  104000                          HLT                     ;NEX CAN'T BE CLEARED BY MOVING A 0 TO IT
003356  005077  175436          N1413:  CLR     @DRBA           ;TRY TO CLEAR BAOF
003362  005777  175434                  TST     @DRST           ;CHECK EPROR BIT AGAIN
003366  001401                          BEQ     .+4             ;IS IT CLEAR
003370  104000                          HLT                     ;ERROR CAUSED BY SOMETHING OTHER THAN NEX,ATTN, OR BAOF
003372  012777  177777  175416  NPRRDY: MOV     #-1,@DRWC       ;SET UP FOR 1 TRANSFER
003400  012777  001034  175412          MOV     #NPR1,@DRBA     ;TRANSFER FROM BUS ADDRESS IN NPR1
003406  005077  175412                  CLR     @DRDB           ;GET READY TO RECEIVE DATA
003412  012767  052525  175414          MOV     #52525,NPR1     ;SET UP TRANSFER DATA
003420  012777  003464  175404          MOV     #INTB,@DRINV    ;INTERRUPT VECTOR TC INTB
003426  012777  000005  175372          MOV     #5,@DRVS        ;INTERRUPT PRICRITY TO LEVEL 5
003434  005077  175354                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
003440  012777  000101  175354          MOV     #101,@DRST      ;IE AND DO TO DRST
003446  005067  000002                  CLR     1$+2            ;WAIT FOR NPR AND INTERRUPT
003452  005227  000001          1$:     INC     #1
003456  001375                          BNE     1$
003460  104000                          HLT                     ;NO DR11-B INTERRUPT
003462  000424                          BR      T33CLR          ;CLEAR IE
003464  004767  003312          INTB:   JSR     %7,ERRCHK
003470  005777  175322                  TST     @DRWC           ;TEST DRWC
003474  001401                          BEQ     .+4             ;IS DRWC EQUAL TO ZERO?
003476  104000                          HLT                     ;DRWC NOT EQUAL TO ZERO
003500  022777  001036  175312          CMP     #NPR1+2,@DRBA   ;COMPARE CORRECT DRBA WITH DRBA
003506  001401                          BEQ     .+4             ;IS THE DRBA CORRECT?
003510  104000                          HLT                     ;DRBA IS WRONG
003512  022777  052525  175304          CMP     #52525,@DRDB    ;CHECK FOR CORRECT DATA
003520  001401                          BEQ     .+4             ;DATA GET TRANSFERRED?
003522  104000                          HLT                     ;BAD DATA IN DRDB
003524  004767  003162                  JSR     %7,NORMAL
003530  022626                          CMP     (%6)+,(%6)+     ;RESTORE STACK
003532  000403                          BR      TNPRC           ;GO TO NEXT TEST (NPR OUT)
003534  005077  175262          T33CLR: CLR     @DRST           ;CLEAR IE
003540  000662                          BR      TNPR1           ;TRY TEST AGAIN
                                ;;**************************************************************
                                ;       TEST 34 TEST FOR 1 DATO NPR TRANSFER (WITH M968 IN USER SLOTS)
                                ;;**************************************************************
003542  104400                  TNPRO:  SCOPE
003544  012777  177777  175244          MOV     #-1,@DRWC       ;SET UP FOR 1 TRANSFER
003552  012777  001034  175240          MOV     #NPR1,@DRBA     ;TRANSFER TO BUS ADDRESS IN NPR1
003560  005067  175250                  CLR     NPR1            ;GET READY TO RECEIVE DATA
003564  012777  052525  175232          MOV     #52525,@DRDB    ;SET UP TO TRANSFER DATA
003572  012777  003636  175232          MOV     #INTC,@DRINV    ;INTERRUPT VECTOR TO INTC
003600  016777  175224  175220          MOV     DRINL,@DRVS     ;INTERRUPT STATUS TO LEVEL DRINL
003606  005077  175202                  CLR     @PSW            ;PROC STATUS TO ZERO
003612  012777  000103  175202          MOV     #103,@DRST      ;IE, FNCTION CONTROL, AND DO TO DRST
```

```
1050  003620  005067  000002          CLR     1$+2            ;WAIT FOR NPR AND INTER
1051  003624  005227  000001  1$:     INC     #1
1052  003630  001375                  BNE     1$
1053  003632  104000                  HLT                     ;NO DR11-B INTERRUPT
1054  003634  000424                  BR      T34CLR          ;CLEAR IE
1055  003636  004767  003140  INTC:   JSR     %7,ERRCHK
1056  003642  005777  175150          TST     @DRWC           ;TEST DRWC
1057  003646  001401                  BEQ     .+4             ;IS DRWC EQUAL TO ZERO?
1058  003650  104000                  HLT                     ;DRWC EQLAL TO ZERO
1059  003652  022777  001036  175140  CMP     #NPR1+2,@DRBA   ;COMPARE CORRECT DR3A WITH DR3A
1060  003660  001401                  BEQ     .+4             ;IS THE DRBA CORRECT?
1061  003662  104000                  HLT                     ;DRBA IS WRONG
1062
1063  003664  026727  175144  052525  CMP     NPR1,#52525     ;CHECK FOR CORRECT DATA
1064  003672  001401                  BEQ     .+4             ;CORRECT DATA TRANSFERRED?
1065  003674  104000                  HLT                     ;BAD DATA
1066  003676  004767  003010          JSR     %7,NORMAL
1067  003702  022626                  CMP     (%6)+,(%6)+     ;RESTORE STACK
1068  003704  000403                  BR      T35             ;GO TO NEXT TEST
1069  003706  005077  175110  T34CLR: CLR     @DRST           ;CLEAR IE
1070  003712  000713                  BR      TNPRO           ;TRY TEST AGAIN
1071
1072                                  ;;*****************************************************************
1073                                  ;       TEST 35 STRING OF 10 DATI'S (WITH M968 IN USER SLOTS)
1074                                  ;;*****************************************************************
1075  003714  104430          T35:    SCOPE
1076  003716  012767  000020  175120  MOV     #20,BUFLEN      ;LENGTH OF BUFFER=20
1077  003724  004767  002524          JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1078  003730  006267  175110          ASR     BUFLEN          ;BUFLEN=10
1079  003734  016767  175104  175110  MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1080  003742  005467  175104          NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1081  003746  016777  175100  175042  MOV     WCLEN,@DRWC     ;SET UP DRWC
1082  003754  016777  175060  175036  MOV     INBUF,@DRBA     ;SET UP DRBA
1083  003762  012777  177777  175034  MOV     #-1,@DRDB       ;MAINT AIDE
1084  003770  012777  006556  175034  MOV     #INTA,@DRINV    ;INT VECTOR TO INTA
1085  003776  016777  175026  175022  MOV     DRINL,@DRVS     ;INT VECTOR TO PRIORITY DRINL
1086  004004  005077  175004          CLR     @PSW            ;LET THE DR11-B INTERRUPT
1087  004010  012777  000101  175004  MOV     #101,@DRST      ;IE AND DO TO DRST
1088  004016  000777                  BR      .               ;WAIT FOR INTERRUPT
1089  004020  022777  000007  174776  CMP     #7,@DRDB        ;CHECK THAT WORD #10 OF INBUF IS IN DRBA
1090  004026  001401                  BEQ     .+4             ;IS IT?
1091  004030  104000                  HLT                     ;BAD DATA IN DRDB
1092
1093                                  ;;*****************************************************************
1094                                  ;       TEST 36 STRING OF 10 DATO'S (WITH M968 IN USER SLOTS)
1095                                  ;;*****************************************************************
1096  004032  104400                  SCOPE
1097  004034  012767  000020  175002  MOV     #20,BUFLEN      ;LENGTH OF BUFFER=20
1098  004042  004767  002406          JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1099  004046  006267  174772          ASR     BUFLEN          ;BUFLEN=10
1100  004052  016767  174766  174772  MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1101  004060  005467  174766          NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1102  004064  016777  174762  174724  MOV     WCLEN,@DRWC     ;SET UP DRWC
1103  004072  016777  174742  174720  MOV     INBUF,@DRBA     ;SET UP DRBA
1104  004100  012777  052525  174716  MOV     #52525,@DRDB    ;SET UP DRDB
1105  004106  012777  006556  174716  MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
```

```
 1106  004114  016777  174710  174704          MOV     DRINL,@DRVS     ;INTERRUPT VECTOR TO PRIORITY DRINL
 1107  004122  005077  174666                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
 1108  004126  012777  000103  174666          MOV     #103,@DRST      ;IE, FNCT1(C1 CONTROL), AND DO TO DRST
 1109  004134  000777                          BR      .               ;WAIT FOR INTERRUPT
 1110  004136  004767  002572                  JSR     %7,DATOCK       ;CHECK INBUF
 1111
 1112                                  ;;*****************************************************************
 1113                                  ;       TEST 37 STRING OF 200 DATI'S
 1114                                  ;;*****************************************************************
 1115  004142  104400                  SCOPE
 1116  004144  012767  000200  174672          MOV     #200,BUFLEN     ;LENGTH OF BUFFER=200
 1117  004152  004767  002276                  JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
 1118  004156  016767  174662  174666          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
 1119  004164  005467  174662                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
 1120  004170  016777  174656  174620          MOV     WCLEN,@DRWC     ;SET UP DRWC
 1121  004176  016777  174636  174614          MOV     INBUF,@DRBA     ;SET UP DRBA
 1122  004204  012777  177777  174512          MOV     #-1,@DRDB       ;MAINT AIDE
 1123  004212  012777  006556  174612          MOV     #INTA,@DRINV    ;INT VECTOR TO INTA
 1124  004220  016777  174604  174600          MOV     DRINL,@DRVS     ;INT VECTOR TO PRIORITY DRINL
 1125  004226  005077  174562                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
 1126  004232  012777  000101  174562          MOV     #101,@DRST      ;IE AND DO TO DRST
 1127  004240  000777                          BR      .               ;WAIT FOR INTERRUPT
 1128  004242  022777  000177  174554          CMP     #177,@DRDB      ;CHECK THAT WORD #200 OF INBUF IS IN DRBA
 1129  004250  001401                          BEQ     .+4             ;IS IT?
 1130  004252  104000                          HLT                     ;BAD DATA IN DRDB
 1131
 1132                                  ;;*****************************************************************
 1133                                  ;       TEST 40 STRING OF 200 DATO'S
 1134                                  ;;*****************************************************************
 1135  004254  104400                  SCOPE
 1136  004256  012767  000201  174560          MOV     #201,BUFLEN     ;LENGTH OF BUFFER=201
 1137  004264  004767  002164                  JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
 1138  004270  005367  174550                  DEC     BUFLEN          ;BUFLEN=200
 1139  004274  016767  174544  174550          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
 1140  004302  005467  174544                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
 1141  004306  016777  174540  174502          MOV     WCLEN,@DRWC     ;SET UP DRWC
 1142  004314  016777  174520  174476          MOV     INBUF,@DRBA     ;SET UP DRBA
 1143  004322  012777  052525  174474          MOV     #52525,@DRDB    ;SET UP DRDB
 1144  004330  012777  006556  174474          MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
 1145  004336  016777  174466  174462          MOV     DRINL,@DRVS     ;INTERRUPT VECTOR TO PRIORITY DRINL
 1146  004344  005077  174444                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
 1147  004350  012777  000103  174444          MOV     #103,@DRST      ;IE, FNCT1, AND DO TO DRST
 1148  004356  000777                          BR      .               ;WAIT FOR INTERRUPT
 1149  004360  004767  002350                  JSR     %7,DATOCK       ;CHECK INBUF
 1150
 1151                                  ;;*****************************************************************
 1152                                  ;       TEST 42 TEST THAT DOING A DATO TO THE DIODE MEMORY CAUSES NEX
 1153                                  ;;*****************************************************************
 1154  004364  104400                  SCOPE
 1155  004366  012777  177776  174422          MOV     #-2,@DRWC       ;SET UP DRWC
 1156  004374  016777  174436  174416          MOV     DIOMEM,@DRBA    ;SET UP DRBA
 1157  004402  012777  004436  174422          MOV     #NEXCHK,@DRINV  ;INTERRUPT VECTOR TO NEXCHK
 1158  004410  016777  174414  174410          MOV     DRINL,@DRVS     ;INTERRUPT STATUS TO LEVEL DRINL
 1159  004416  005077  174372                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
 1160  004422  012777  000163  174372          MOV     #163,@DRST      ;IE, FNCT1, XBA17, XBA16, AND GO TO DRST
 1161  004430  005237  177560                  INC     @#177560        ;WAIT FOR INTERRUPT
 1162  004434  104000                          HLT                     ;NO DR11-B INTERRUPT
```

```
1162  004436  005777  174360          NEXCHK: TST     @DRST           ;TEST DRST
1163  004442  001001                          BNE     .+4             ;ERROR SET?
1164  004444  104000                          HLT                     ;ERROR NOT SET
1165  004446  105777  174350                  TSTB    @DRST           ;TEST FOR READY
1166  004452  001001                          BNE     .+4             ;READY SET?
1167  004454  104000                          HLT                     ;READY ISN'T SET
1168  004456  032777  040000  174336          BIT     #BIT14,@DRST    ;CHECK NEX
1169  004464  001001                          BNE     .+4             ;NEX SET?
1170  004466  104000                          HLT                     ;NEX IS CLEAR
1171  004470  022626                          CMP     (%6)+,(%6)+     ;RESTORE THE STACK
1172  004472  004767  002214                  JSR     %7,NORMAL
1173
1174                                  ;;*****************************************************************
1175                                  ;       TEST 43 TEST THAT BAOF FORCES ERROR AND READY AND THAT BAOF IS
1176                                  ;       CLEARED BY CLEARING THE DRBA OR A RESET
1177                                  ;;*****************************************************************
1178  004476  104400                          SCOPE
1179  004500  012767  000010  005222          MOV     #10,ICOUNT
1180  004506  012777  177760  174302          MOV     #-20,@DRWC      ;SET UP DRWC
1181  004514  012777  177776  174276          MOV     #-2,@DRBA       ;SET UP DRBA FOR PROC STATUS ADDRESS
1182  004522  012777  004556  174302          MOV     #BAOFCK,@DRINV  ;INTERRUPT VECTOR TO BAOFCK
1183  004530  016777  174274  174270          MOV     DRINL,@DRVS     ;INTERRUPT STATUS TO LEVEL DRINL
1184  004536  005077  174252                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1185  004542  012777  000163  174252          MOV     #163,@DRST      ;IE, FNCT1, XBA17, XBA16, AND GO TO DRST
1186  004550  005237  177560                  INC     @#177560        ;WAIT FOR INTERRUPT
1187  004554  104000                          HLT                     ;NO DR11-B INTERRUPT
1188  004556  022626                  BAOFCK: CMP     (%6)+,(%6)+     ;RESTORE THE STACK
1189  004560  005777  174236                  TST     @DRST           ;TEST DRST
1190  004564  100401                          BMI     .+4             ;ERROR SET?
1191  004566  104000                          HLT                     ;ERROR NOT SET
1192  004570  105777  174226                  TSTB    @DRST           ;TEST FOR READY
1193  004574  100401                          BMI     .+4             ;READY SET?
1194  004576  104000                          HLT                     ;READY ISN'T SET
1195  004600  042777  040000  174214          BIC     #BIT14,@DRST    ;CLEAR NEX
1196  004606  032777  060000  174206          BIT     #60000,@DRST    ;CHECK NEX AND ATTN
1197  004614  001401                          BEQ     .+4             ;ARE THEY CLEAR?
1198  004616  104000                          HLT                     ;NEX AND/OR ATTN IS SET
1199  004620  005777  174176                  TST     @DRST           ;TEST FOR ERROR
1200  004624  100401                          BMI     .+4             ;IS ERROR SET?
1201  004626  104000                          HLT                     ;ERROR IS CLEAR
1202  004630  005077  174164                  CLR     @DRBA           ;CLEAR BAOF
1203  004634  005777  174162                  TST     @DRST           ;CHECK ERROR
1204  004640  100001                          BPL     .+4             ;SHOULD BE CLEAR
1205  004642  104000                          HLT                     ;CLEARING DRBA DIDN'T CLEAR BAOF
1206
1207  004644  012777  177776  174146          MOV     #-2,@DRBA       ;SET UP DRBA FOR PROC STATUS ADDRESS
1208  004652  012777  004706  174152          MOV     #BAOCK1,@DRINV  ;INTERRUPT VECTOR TO BAOCK1
1209  004660  016777  174144  174140          MOV     DRINL,@DRVS     ;INTERRUPT STATUS TO LEVEL DRINL
1210  004666  005077  174122                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
1211  004672  012777  000163  174122          MOV     #163,@DRST      ;I.E., XBA17,XBA16,FNCT1, AND GO TO DRST
1212  004700  005237  177560                  INC     @#177560        ;WAIT FOR INTERRUPT
1213  004704  104000                          HLT                     ;NO DR11-B INTERRUPT
1214  004706  022626                  BAOCK1: CMP     (%6)+,(%6)+     ;RESTORE THE STACK
1215  004710  005777  174106                  TST     @DRST           ;TEST DRST
1216  004714  100401                          BMI     .+4             ;ERROR SET?
1217  004716  104000                          HLT                     ;ERROR NOT SET
```

```
1218  004720  105777  174076          TSTB    @DRST           ;TEST FOR READY
1219  004724  100401                  BMI     .+4             ;READY SET?
1220  004726  104000                  HLT                     ;READY ISN'T SET
1221  004730  042777  040000  174064  BIC     #BIT14,@DRST    ;CLEAR NEX
1222  004736  032777  060000  174056  BIT     #60000,@DRST    ;CHECK NEX AND ATTN
1223  004744  001401                  BEQ     .+4             ;ARE THEY CLEAR?
1224  004746  104000                  HLT                     ;NEX AND/OR ATTN IS SET
1225  004750  005777  174046          TST     @DRST           ;TEST FOR ERROR
1226  004754  100401                  BMI     .+4             ;IS ERROR SET?
1227  004756  104000                  HLT                     ;ERROR IS CLEAR
1228  004760  004767  004766          JSR     %7,CKSWR
1229  004764  000005                  RESET                   ;INIT
1230  004766  005777  174030          TST     @DRST           ;CHECK ERROR
1231  004772  100001                  BPL     .+4             ;SHOULD BE CLEAR
1232  004774  104000                  HLT                     ;RESET DIDN'T CLEAR BADF
1233  004776  004767  001710          JSR     %7,NORMAL
1234
1235                                  ;;******************************************************************
1236                                  ;       TEST 44 TEST THAT RESET CLEARS DRDB
1237                                  ;;******************************************************************
1238  005002  104400                  SCOPE
1239  005004  012767  000010  004716  MOV     #10,ICOUNT
1240  005012  012777  177777  174004  MOV     #-1,@DRDB       ;ALL ONES TO DRBA
1241  005020  004767  004726          JSR     %7,CKSWR
1242  005024  000005                  RESET                   ;INIT
1243  005026  005777  173772          TST     @DRDB           ;LOOKING FOR Z-BIT TO SET
1244  005032  001401                  BEQ     .+4             ;DID DRDB GET CLEARED?
1245  005034  104000                  HLT                     ;DRDB NOT CLEAR
1246
1247                                  ;;******************************************************************
1248                                  ;       TEST 45 TEST THAT ALL DRDB BITS CAN BE SET
1249                                  ;;******************************************************************
1250  005036  104400                  SCOPE
1251  005040  012767  004000  004662  MOV     #4000,ICOUNT
1252  005046  012777  177777  173750  MOV     #-1,@DRDB       ;SET ALL BITS IN DRDB
1253  005054  022777  177777  173742  CMP     #-1,@DRDB       ;LOOKING FOR Z-BIT TO SET
1254  005062  001401                  BEQ     .+4             ;SEE IF ALL BITS GOT SET
1255  005064  104000                  HLT                     ;ALL DRDB BITS AREN'T SET
1256
1257                                  ;;******************************************************************
1258                                  ;       TEST 46 TEST THAT DRDB CAN HOLD ALTERNATE ONE'S AND ZERO'S
1259                                  ;;******************************************************************
1260  005066  104400                  SCOPE
1261  005070  012777  052525  173726  MOV     #052525,@DRDB   ;ALT 0'S AND 1'S TO DRDB
1262  005076  022777  052525  173720  CMP     #052525,@DRDB   ;LOOKING FOR Z-BIT TO SET
1263  005104  001401                  BEQ     .+4             ;DOES DRDB HAVE THE CORRECT PATTERN?
1264  005106  104000                  HLT                     ;DRDB IS WRONG
1265  005110  012777  125252  173706  MOV     #125252,@DRDB   ;ALT 1'S AND 0'S TO DRDB
1266  005116  022777  125252  173700  CMP     #125252,@DRDB   ;LOOKING FOR Z-BIT TO SET
1267  005124  001401                  BEQ     .+4             ;DOES DRDB HAVE THE CORRECT PATTERN
1268  005126  104000                  HLT                     ;DRDB IS WRONG
1269
1270                                  ;;******************************************************************
1271                                  ;       TEST 47 INCREMENTING PATTERN TO WRAP-AROUND IN DRDB
1272                                  ;;******************************************************************
1273  005130  104400                  SCOPE
```

```
 1274  005132  005067  004572                  CLR     ICOUNT
 1275  005136  005001                          CLR     %1                      ;SET-UP
 1276  005140  005077  173660                  CLR     @DRDB                   ;SET-UP
 1277  005144  020177  173654          INCDB:  CMP     %1,@DRDB                ;SEE IF THEY ARE EQUAL
 1278  005150  001401                          BEQ     .+4                     ;ARE THEY EQUAL?
 1279  005152  104000                          HLT                             ;THEY'RE NOT EQUAL
 1280  005154  005277  173644                  INC     @DRDB                   ;GET NEXT NUMBER
 1281  005160  005201                          INC     %1                      ;GET NEXT NUMBER
 1282  005162  001370                          BNE     INCDB                   ;DONE WITH TEST? IF NOT CONTINUE
 1283
 1284                                  ;;*****************************************************************
 1285                                  ;       TEST 50 TEST THAT RESET SETS READY AND CLEARS ALL OTHER
 1286                                  ;       DRST BITS (WITH M968 INSERTED)
 1287                                  ;;*****************************************************************
 1288  005164  104400                          SCOPE
 1289  005166  004767  004560                  JSR     %7,CKSWR
 1290  005172  000005                          RESET                           ;INIT
 1291  005174  032777  000200  173620          BIT     #BIT7,@DRST             ;CHECK DRST
 1292  005202  001001                          BNE     .+4                     ;IS READY SET?
 1293  005204  104000                          HLT                             ;READY IS CLEAR
 1294  005206  032777  177577  173606          BIT     #177577,@DRST           ;CHECK DRST
 1295  005214  001401                          BEQ     .+4                     ;ARE THEY ALL CLEAR?
 1296  005216  104000                          HLT                             ;A BIT OTHER THAN READY IS SET IN THE DRST
 1297
 1298                                  ;;*****************************************************************
 1299                                  ;       TEST 51 TEST THAT BADO READS AS A ZERO WITH MAINT BOARD INSERTED
 1300                                  ;;*****************************************************************
 1301  005220  104400                          SCOPE
 1302  005222  012767  004000  004500          MOV     #4000,ICOUNT
 1303  005230  032777  000001  173582          BIT     #BIT0,@DRBA             ;TEST BIT 0 OF DRBA
 1304  005236  001401                          BEQ     .+4                     ;IS IT CLEAR?
 1305  005240  104000                          HLT                             ;BADO IS SET
 1306
 1307
 1308
 1309                                  ;;*****************************************************************
 1310                                  ;       TEST 52 TEST THAT GO CLEARS READY
 1311                                  ;;*****************************************************************
 1312  005242  104400                          SCOPE
 1313  005244  012767  004000  004456          MOV     #4000,ICOUNT
 1314  005252  012777  177600  173536          MOV     #-200,@DRWC             ;SET-UP DRWC
 1315  005260  016777  173554  173532          MOV     INBUF,@DRBA             ;SET-UP DRBA
 1316  005266  105777  173530                  TSTB    @DRST                   ;CHECK READY
 1317  005272  100401                          BMI     .+4                     ;IS READY SET?
 1318  005274  104000                          HLT                             ;READY IS CLEAR
 1319  005276  012777  000011  173516          MOV     #11,@DRST               ;FNCT3 (NON-BURST) AND GO TO DRST
 1320  005304  105777  173512                  TSTB    @DRST                   ;CHECK READY
 1321  005310  100001                          BPL     .+4                     ;IS READY CLEAR?
 1322  005312  104000                          HLT                             ;READY IS STILL SET
 1323  005314  005067  173534                  CLR     RDYCHK                  ;CLEAR READY CHECK
 1324  005320  105777  173476          TSTRDY: TSTB    @DRST                   ;CHECK READY
 1325  005324  100406                          BMI     DONE                    ;IF SET GO TO DONE
 1326  005326  062767  000004  173520          ADD     #4,RDYCHK               ;CHECKING TIME FOR READY TO BE SET
 1327  005334  100401                          BMI     .+4                     ;IF RDYCHK GETS NEGATIVE IT TOOK TOO LONG
 1328  005336  000770                          BR      TSTRDY                  ;CHECK AGAIN
 1329  005340  104000                          HLT                             ;READY GOT CLEARED BUT NEVER SET AGAIN
```

```
1330  005342  000240                    DONE:   NOP                     ;GO TO NEXT TEST
1331                                    ;;**************************************************************
1332                                    ;TEST 55 TEST THAT GIVING A DO WITHOUT CLEARING A PREVIOUS ERROR
1333                                    ;CAUSES ANOTHER INTERRUPT
1334                                    ;;**************************************************************
1335  005344  104400                            SCOPE
1336  005346  012777  177760  173442            MOV     #-20,@DRWC      ;SET-UP DRWC
1337  005354  016777  173456  173436            MOV     DIOMEM,@DRBA    ;SET-UP DRBA
1338  005362  012777  005416  173442            MOV     #ERRD0,@DRINV   ;INTERRUPT VECTOR TO ERRD0
1339  005370  012777  000200  173430            MOV     #200,@DRVS      ;INTERRUPT STATUS TO LEVEL 4
1340  005376  005077  173412                    CLR     @PSW            ;LET THE DR11-B INTERRUPT
1341  005402  012777  000163  173412            MOV     #163,@DRST      ;IE, XBA17,XBA16,FNCT1 AND GO TO DRST
1342  005410  005277  173442                    INC     @TKS            ;WAIT FOR INTERJPT
1343  005414  104000                            HLT                     ;NO DR11-B INTERRUPT
1344  005416  005777  173400          ERRD0:    TST     @DRST           ;TEST DRST
1345  005422  100401                            BMI     .+4             ;ERROR SET?
1346  005424  104000                            HLT                     ;ERROR IS CLEAR - SHOULD HAVE NEX
1347  005426  012777  005474  173376            MOV     #ERRD01,@DRINV  ;INTERRUPT VECTOR TO ERRD01
1348  005434  005077  173360                    CLR     @DRBA           ;PREVENT CAUSING ANOTHER ERROR
1349  005440  042777  000062  173354            BIC     #62,@DRST       ;CLEAR XBA17, XBA16, AND FNCT1
1350  005446  012777  177777  173342            MOV     #-1,@DRWC       ;SET-UP DRWC
1351  005454  005277  173342                    INC     @DRST           ;DO TO DRST
1352  005460  005067  000002                    CLR     1$+2
1353  005464  005227  000001          1$:       INC     #1
1354  005470  001375                            BNE     1$
1355  005472  104000                            HLT                     ;NO DR11-B INTERRUPT
1356  005474  005777  173322          ERRD01:   TST     @DRST           ;CHECK ERROR
1357  005500  100401                            BMI     .+4             ;ERROR SET?
1358  005502  104000                            HLT                     ;ERROR IS CLEAR - SHOULD BE SET BECAUSE
1359                                                                    ;PREVIOUS ERROR WAS NOT CLEARED
1360  005504  062706  000010                    ADD     #10,%6          ;REPOSITION THE STACK
1361  005510  004767  001176                    JSR     %7,NORMAL
1362
1363                                    ;;**************************************************************
1364                                    ;       TEST 56 STRING OF 200 DATI'S NON-BURST MODE
1365                                    ;;**************************************************************
1366  005514  104400                            SCOPE
1367  005516  012767  000200  173320            MOV     #200,BUFLEN     ;LENGTH OF BUFFER=200
1368  005524  004767  000724                    JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
1369  005530  016767  173310  173314            MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
1370  005536  005467  173310                    NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
1371  005542  016777  173304  173246            MOV     WCLEN,@DRWC     ;SET-UP DRWC
1372  005550  016777  173264  173242            MOV     INBUF,@DRBA     ;SET-UP DRBA
1373  005556  012777  177777  173240            MOV     #-1,@DRDB       ;MAINT AIDE
1374  005564  012777  006556  173240            MOV     #INTA,@DRINV    ;INT VECTOR TO INTA
1375  005572  016777  173232  173226            MOV     DRINL,@DRVS     ;INT VECTOR TO PRIORITY DRINL
1376  005600  005077  173210                    CLR     @PSW            ;LET THE DR11-B INTERRUPT
1377  005604  012777  000111  173210            MOV     #111,@DRST      ;IE, FNCT3, AND DO TO DRST
1378  005612  005267  173232                    INC     BRWAIT          ;USE A WAIT OR BR. INSTRUCTION
1379  005616  032767  000001  173224            BIT     #BIT0,BRWAIT    ;SEE WHICH ONE
1380  005624  001403                            BEQ     DATINB          ;BIT 0 CLEAR=BR.
1381  005626  000001                            WAIT                    ;WAIT FOR INTERRUPT
1382  005630  000240                            NOP
1383  005632  000401                            BR      .+4
1384  005634  000777                  DATINB:   BR      .
1385  005636  022777  000177  173160            CMP     #177,@DRDB      ;CHECK THAT WORD #200 OF INBUF IS IN DRBA
```

```
 1396  005644  001401                        BEQ     .+4             ;IS IT?
 1397  005646  104000                        HLT                     ;BAD DATA IN DRDB
 1398
 1399
 1400                          ;;************************************************************
 1401                          ;       TEST 57 STRING OF 200 DATO'S NON-BURST MODE
 1402                          ;;************************************************************
 1403  005650  104400                        SCOPE
 1404  005652  012767  000201  173164        MOV     #201,BUFLEN     ;LENGTH OF BUFFER=201
 1405  005660  004767  000570                JSR     %7,LODBUF       ;LOAD THE BUFFER WITH INCREMENTING PATTERN
 1406  005664  005367  173154                DEC     BUFLEN          ;BUFLEN=200
 1407  005670  016767  173150  173154        MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
 1408  005676  005467  173150                NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
 1409  005702  016777  173144  173106        MOV     WCLEN,@DRWC     ;SET UP DRWC
 1410  005710  016777  173124  173102        MOV     INBUF,@DRBA     ;SET UP DRBA
 1411  005716  012777  052525  173100        MOV     #52525,@DRDB    ;SET UP DRDB
 1412  005724  012777  006556  173100        MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
 1413  005732  016777  173072  173066        MOV     DRINL,@DRVS     ;INTERRUPT VECTOR TO PRIORITY DRINL
 1414  005740  005077  173050                CLR     @PSW            ;LET THE DR11-B INTERRUPT
 1415  005744  012777  000113  173050        MOV     #113,@DRST      ;IE, FNCT3, FNCT1, AND DO TO DRST
 1416  005752  005267  173072                INC     BRWAIT          ;USE A WAIT OR BR. INSTRUCTION
 1417  005756  032767  000001  173064        BIT     #BIT0,BRWAIT    ;BIT 0 CLEAR=BR.
 1418  005764  001403                        BEQ     DATONB
 1419  005766  000001                        WAIT                    ;WAIT FOR INTERRUPT
 1420  005770  000240                        NOP
 1421  005772  000401                        BR      .+4
 1422  005774  000777              DATONB:   BR      .
 1423  005776  004767  000732                JSR     %7,DATOCK       ;CHECK INBUF
 1424
 1425                          ;;************************************************************
 1426                          ;       TEST 60 TEST THAT FUNCTION BITS INCREMENT WITH MAINT MODE TRANSFERS
 1427                          ;;************************************************************
 1428  006002  104400                        SCOPE
 1429  006004  012767  000010  173032        MOV     #10,BUFLEN      ;SET-UP BUFLEN FOR LODBUF AND CHKBUFF
 1430  006012  016777  173022  173000        MOV     INBUF,@DRBA     ;SET-UP DR2A
 1431  006020  004767  000430                JSR     %7,LODBUF       ;LOAD INBUF
 1432  006024  004767  000462                JSR     %7,CHKBFF       ;LOAD CHKBUF
 1433  006030  005077  172766                CLR     @DRST           ;INIT FOR STARTING
 1434  006034  012767  000001  173024        MOV     #1,FNCONT       ;GET READY FOR CHECKING
 1435  006042  012767  000001  172774        MOV     #1,BUFLEN       ;CHANGE IS NECESSARY FOR INTA ROUTINE
 1436  006050  016767  172764  173012        MOV     INBUF,INBUF1    ;SAVE INBUF
 1437  006056  012777  006556  172746  MFLOOP: MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
 1438  006064  016777  172740  172734        MOV     DRINL,@DRVS     ;INTERRUPT VECTOR PRIORITY TO DRINL
 1439  006072  005077  172716                CLR     @PSW            ;LET THE DR11-B INTERRUPT
 1440  006076  012777  177777  172712        MOV     #-1,@DRWC       ;SET-UP FOR 1 TRANSFER
 1441  006104  052777  010101  172710        BIS     #10101,@DRST    ;MAINT, IE, AND DO TO DRST
 1442  006112  000001                        WAIT                    ;WAIT FOR INTERRUPT
 1443  006114  000240                        NOP                     ;FAKE-OUT RETURN ADDRESS CHANGING
 1444  006116  117701  172700                MOVB    @DRST,%1        ;LOWER BYTE OF DRST TO R1
 1445  006122  042701  000600                BIC     #600,%1         ;GET RID OF READY AND CYCLE BECAUSE OF MAINT MODE
 1446  006126  006201                        ASR     %1              ;MOVE IT RIGHT ONE PLACE
 1447  006130  126701  172732                CMPB    FNCONT,%1       ;CHECK AGAINST FNCONT
 1448  006134  001401                        BEQ     .+4             ;SHOULD BE EQUAL
 1449  006136  104000                        HLT                     ;FUNCTION BITS DIDN'T INCREMENT IN MAINT MODE
 1450  006140  005267  172722                INC     FNCONT          ;GET READY FOR NEXT PASS
 1451  006144  022767  000010  172714        CMP     #10,FNCONT      ;ONLY 10 BECAUSE FNCT3-1 GO TO ZERO
 1452  006152  001404                        BEQ     MFCHK           ;IF ITS EQUAL GO CHECK DATA
```

```
                                        ;;*****************************************************************
                                        ;       TEST 61 TEST FOR 10 MAINT MODE TRANSFERS
                                        ;;*****************************************************************
006622  104440                          SCOPE
006624  012767  000010  172630          MOV     #10.BUFLEN      ;BUFLEN=10
006632  016767  172624  172633          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
006640  005467  172630                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
006644  004767  000254                  JSR     %7,LODBUF       ;LOAD IN BUFFER WITH INCREMENTING PATTERN
006650  004767  000254                  JSR     %7,CHKBFF       ;LOAD CHECK BUFFER WITH MODIFIED INCREMENTING PATTERN
006654  016777  172610  172552          MOV     WCLEN,@DRWC     ;SET UP DRWC
006662  016777  172606  172546          MOV     INBUF,@DRBA     ;SET UP DRBA
006670  012777  177777  172544          MOV     #-1,@DRDB       ;MAINT MODE
006676  012777  000556  172544          MOV     #INTA,@DRINV    ;INTERRUPT VECTOR TO INTA
006704  012767  000536  172532          MOV     DRINL,@DRVS     ;INTERRUPT STATUS AT PRIORITY DRINL
006712  005067  172514                  CLR     @PSW            ;LET DR11-B INTERRUPT
006716  012777  010101  172514          MOV     #10101,@DRST    ;MAINT, IE, AND DO TO DRST
006724  000000                          BR      .               ;WAIT FOR INTERRUPT
006726  004767  000336                  JSR     %7,DATCHK

                                        ;;*****************************************************************
                                        ;       TEST 62 TEST FOR 200 NPR TRANSFERS IN MAINT MODE
                                        ;;*****************************************************************
006732  104400                          SCOPE
006734  012767  000200  172520          MOV     #200,BUFLEN     ;LENGTH OF BUFFER = 200
006742  016767  172514  172520          MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR DRWC
006750  005467  172514                  NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
006754  004767  000112                  JSR     %7,LODBUF       ;LOAD INBUF WITH INCREMENTING PATTERN
006760  004767  000144                  JSR     %7,CHKBFF       ;LOAD CHKBUF WITH MODIFIED INCREMENTED PATTERN
006764  016777  172500  172442          MOV     WCLEN,@DRWC     ;SET UP DRWC
006772  016777  172460  172436          MOV     INBUF,@DRBA     ;SET UP DRBA
007000  012777  000001  172434          MOV     #1,@DRDB        ;MAINT MODE
007006  012777  006556  172434          MOV     #INTA,@DRINV    ;INT VECTOR TO INTA
007014  016777  172426  172422          MOV     DRINL,@DRVS     ;INT VECTOR AT PRIORITY DRINL
007022  005077  172404                  CLR     @PSW            ;LET THE DR11-B INTERRUPT
007026  012777  010101  172404          MOV     #010101,@DRST   ;FOLLOWING TO DRST:  MAINT(12),IE(06),DO(00)
007034  005267  172426                  INC     BRWAIT          ;USE A WAIT OR BR. INSTRUCTION
007040  032767  000001  172420          BIT     #BIT0,BRWAIT    ;SEE WHICH ONE
007046  001403                          BEQ     BRANCH          ;BIT 0 CLEAR = BR.
007050  000001                          WAIT
007052  000240                          NOP
007054  000401                          BR      .+4
007056  000777                  BRANCH: BR      .
007060  004767  000204                  JSR     %7,DATCHK       ;CHECK THAT CORRECT DATA WAS TRANSFERRED
007064  104400                          SCOPE
007066  000167  000356                  JMP     BELL            ;DO IT ALL AGAIN.
007072  016702  172360          LODBUF: MOV     INBUF,%2        ;MOVE STARTING ADDRESS OF INBUF TO R2
007076  005067  172362                  CLR     LENCHK          ;CLEAR LENGTH CHECK
007102  005022                          CLR     (%2)+           ;CLEAR STARTING ADDRESS OF INBUFF AND INC BY 2
007104  005267  172354          LOADA:  INC     LENCHK          ;INC LENGTH CHECK BY 1
007110  026767  172350  172344          CMP     LENCHK,BUFLEN   ;CHECK FOR DONE
```

```
                                                        ;IS INBUF FILLED?
                                                        ;LOAD NEXT BUFFER WORD
                                                        ;CONTINUE CHECKING
                                                        ;EXIT
                                                        ;STARTING ADDRESS OF CHECK-BUFFER TO R2
                                                        ;CLEAR LENGTH CHECK
                                                        ;CLEAR R3
                                                        ;MOVE R3 TO CHKBUF ADDRESS AND INC BY 2
                                                        ;MOVE R3 TO NEXT CHKBUF ADDRESS AND INC BY 2
                                                        ;ADD 2 TO LENGTH CHECK
                                                        ;CHECK FOR DONE
                                                        ;IS CHECK-BUFFER FILLED?
                                                        ;NEXT NUMBER FOR BUFFER
                                                        ;CONTINUE FILLING
                                                        ;EXIT
                                                        ;CLEAR IE
                                                        ;CHECKING FOR ERROR
                                                        ;ERROR SET?
                                                        ;ERROR BIT IS SET
                                                        ;CHECKING READY BIT
                                                        ;IS READY SET
                                                        ;FALSE INTERRUPT - ERROR AND READY ARE CLEAR
                                                        ;TEST1 FOR DRWC=0
                                                        ;WAS IT EQUAL?
                                                        ;DRWC NOT =0
                                                        ;BUFFER LENGTH TO R2
                                                        ;NUMBER OF TRANSFERS TIMES 2
                                                        ;CORRECT DRBA
                                                        ;CHECKING DRBA
                                                        ;IS DRBA CORRECT?
                                                        ;DRBA NOT CORRECT
                                                        ;RETURN ADDRESS TO RETURN ADDRESS +2
                                                        ;EXIT

                                                        ;STARTING ADDRESS OF CHECK BUFFER TO R2
                                                        ;STARTING ADDRESS OF IN BUFFER TO R3
                                                        ;CLEAR LENGTH CHECK
                                                        ;MAKE A COMPARISON
                                                        ;IS THE DATA CORRECT?
                                                        ;BRANCH IF OK
                                                        ;BAD DATA
                                                        ;SEE IF THE BUFFER HAS BEEN CHECKED
                                                        ;BUFFER CHECKED?
                                                        ;
                                                        ;RESTORE DR11-B INTERRUPT VECTOR
                                                        ;RESTORE DR11-B INTERRUPT STATUS
                                                        ;RESTORE PROC TO PRIORITY LEVEL 7
                                                        ;EXIT
                                                        ;DATO NUMBER TO R2
                                                        ;STARTING ADDRESS OF IN BUFFER TO R3
                                                        ;CLEAR LENGTH CHECK
                                                        ;MAKE A COMPARISON
                                                        ;IS THE DATA CORRECT?
                                                        ;BRANCH IF OK
                                                        ;BAD DATA
```

```
 007762  026767  172060  172054          CMP     LENCHK,BUFLEN   ;SEE IF THE BUFFER HAS BEEN CHECKED
 007770  001001                          BNE     COMPRR          ;BUFFER CHECKED?
 007772  005267  000136                  INC     .-2,(R3)+       ;CHECK END OF BUFFER + 1
 007776  001004                          BNE     .+4             ;SEE IF TOO MANY WORDS WERE TRANSFERRED
 010000  104000                          HLT                     ;TOO MANY
 010002  000207                          RTS     .7              ;EXIT
 010004  042777  000100  172012  ERRCHK: BIC     #BIT6,@DRST     ;CLEAR IE
 010012  005777  172006                  TST     @DRST           ;CHECKING FOR ERROR
 010016  100001                          BPL     .+4             ;ERROR SET?
 010020  104000                          HLT                     ;ERROR BIT IS SET
 010022  105777  171776                  TSTB    @DRST           ;CHECKING READY BIT
 010026  100401                          BMI     .+4             ;IS RDY SET
 010030  104000                          HLT                     ;FALSE ENTRY - ERROR AND READY ARE CLEAR
 010032  000207                          RTS     .7              ;EXIT

                                ;;*******************************************************************
                                ;       BELL ON PASS COMPLETE
                                ;;*******************************************************************
 010034  012737  000207  177566  BELL:   MOV     #207,@#177566
 010042  105737  177564          1$:     TSTB    @#177564
 010046  100375                          BPL     .-4
 010050  012702  002365                  MOV     #$DR11,%2
 010054  004767  003404                  JSR     %7,TTOUT
                                ;;*******************************************************************
                                ;       ROUTINE TO CHECK FOR TRACE TRAP TO BE RUN WITH PROGRAM
                                ;;*******************************************************************

 010060  004767  002670          TRTRAP: JSR     %7,CKSWR        ;CHECK FO CONT G
 010064  032777  010000  171722          BIT     #10000,@SR      ;SHOULD WE RUN WITH TRACE TRAP
 010072  001417                          BEQ     YESTR           ;YES
 010074  005767  000134                  TST     YESTR1          ;NO  HAVE WE RAN WITH TRACE TRAP ON
 010100  001411                          BEQ     TRPA            ;IF SO RESTORE PREVIOUS CONTENTS
 010102  016767  000076  170706          MOV     YESTR1,14
 010110  016767  000072  170702          MOV     YESTR2,16
 010116  042777  000020  171672          BIC     #20,@PSW        ;CLEAR TRACE TRAP
 010124  000167  172030          TRPA:   JMP     BEGIN           ;START OF TEST WITH TRACE OFF
 010130  000000                  TRPB:   0

                                ;;*******************************************************************
                                ;       SAVE OLD CONTENTS, SET UP FOR TRACE TRAP
                                ;;*******************************************************************
 010132  016767  170660  000044  YESTR:  MOV     14,YESTR1       ;SAVE ODT PC
 010140  016767  170654  000040          MOV     16,YESTR2       ;SAVE ODT STATUS
 010146  012767  010210  170642          MOV     #YESRT,14       ;NEW TRAP VECTOR
 010154  005067  170640                  CLR     16              ;NEW CONDITION CODES
 010160  005077  171634                  CLR     @PSW
 010164  005167  177746                  COM     TRPB
 010170  100403                          BMI     .+10
 010172  052777  000020  171620          BIS     #20,@PSW        ;SET TRACE TRAP
 010200  000167  177756                  JMP     BEGIN           ;START OF TEST WITH TRACE ON

 010204  000000          YESTR1: 0               ;STORAGE FOR ODT PC
 010206  000000          YESTR2: 0               ;STORAG FOR ODT STATUS
 010210  000002          YESRT:  RTI             ;RETURN TO PROGRAM FROM TRAP
 010212  000000                  HALT            ;RTI FAILED
```

```
1610
1611
1612                            ;;*****************************************************************
1613                            ;       BUS TO BUS TEST (DR11-B TO DR11-B)
1614                            ;;*****************************************************************
1615
1616
1617 000000                    R0=%0
1620 000001                    R1=%1
1621 000002                    R2=%2
1622 000003                    R3=%3
1623 000004                    R4=%4
1624 000005                    R5=%5
1625 000006                    R6=%6
1626 000007                    R7=%7
1627 000006                    SP=%6

1630 000001                    GO=1
1631 000002                    FNCT1=2          ;OUTPUT MODE
1632 000004                    FNCT2=4          ;OUTPUT DIRECTION
1633 000010                    FNCT3=10         ;OUTPUT INTER REQ
1634 000020                    XBA16=20
1635 000040                    XBA17=40
1636 000100                    IE=100
1637 000200                    READY=200
1640 000400                    CYCLE=400
1641 001000                    DSTATA=1000      ;INPUT MODE
1642 002000                    DSTATB=2000      ;INPUT DIRECTION
1643 004000                    DSTATC=4000      ;INPUT INTR REQ
1644 010000                    MAINT=10000
1645 020000                    ATTN=20000
1646 040000                    NEX=40000
1647 100000                    ERROR=100000
1650
1651
1652 007312  000004            NWRDXF: 4                ;# OF WORDS TRANSFERRED UNDER FLAG CONTROL PRIOR TO NPR
1653 007314  000000            NEXJOB: 0                ;HOLDS ADDRESS OF READY INTERRUPT ROUTINE
1654 007316  000000                    0                ;HOLDS ADDRESS OF ERROR INTERRUPT ROUTINE
1655 007320  000000            JBFLAG: 0                ;JOB FLAG
1656 007322  000000            JBCNT:  0                ;JOB COUNT
1657                            ;;*****************************************************************
1660                            ;MASTER START
1661                            ;;*****************************************************************
1662 007324  000240            MS1:    NOP
1663 007326  005067  177770            CLR     JBCNT            ;CLEAR JOB COUNT
1664 007332  012706  001566            MOV     #BUFF,R6         ;SETUP STACK
1665 007336  004767  000256            JSR     R7,SETVEC        ;SET UP INTERRUPT VECTORS
1666 007342  005067  177752            CLR     JBFLAG           ;CLEAR JOB FLAG
1667 007346  012757  007700  177740    MOV     #JOBAD,NEXJOB    ;DO JOBAD FIRST
1670 007354  012767  000000  177734    MOV     #0,NEXJOB+2      ;NO ERROR RECOVERY
1671 007362  012777  000340  171524    MOV     #340,@PSW        ;LOCK OUT INTERRUPTS
1672 007370  012777  000100  171524    MOV     #IE,@DRST        ;SET INTERRUPT ENABLE
1673 007376  005077  171512            CLR     @PSW             ;DROP PRIOTIRY TO ZERO
1674 007402  000425                    BR      BACKGD           ;WAIT FOR JOBS IN BACKGROUND
```

```
                                ;;*****************************************************************
                                ;       SLAVE START
                                ;;*****************************************************************

007304  000240                  SS1:    NOP
007306  012706  013566                  MOV     #BUFF,R6
007312  004767  000002                  JSR     R7,SETVEC       ;SET UP INTERRUPT VECTORS
007316  005067  177676                  CLR     JBFLAG
007322  012767  010122  177664          MOV     #SJOB1,NEXJOB   ;FOR READY INTERRUPT
007330  012767  010140  177660          MOV     #SJOB2,NEXJOB+2 ;FOR ERROR INTERRUPT
007336  012777  000340  171455          MOV     #340,@PSW       ;RAISE CP PRIORITY TO 7
007344  012777  000100  171450          MOV     #IE,@DRST       ;SET INTERRUPT ENABLE
007352  005077  171436                  CLR     @PSW            ;DROP CP PRIORITY TO 0 AND ENTER BACKGROUND

                                ;;*****************************************************************
                                ;       BACKGROUND PROGRAM; WAITS FOR JBFLAG TO SET
                                ;;*****************************************************************

007356  005200                  BACKGD: INC     R0
007360  005201                          INC     R1
007362  005202                          INC     R2
007364  005203                          INC     R3
007366  005204                          INC     R4
007370  005205                          INC     R5
007372  020005                          CMP     R0,R5
007374  001402                          BEQ     .+6
007376  104000                          HLT
007400  000000                          HALT                    ;BACKGROUND TEST FAILED
007402  020104                          CMP     R1,R4
007404  001402                          BEQ     .+6
007406  104000                          HLT
007410  000000                          HALT                    ;BACKGROUND TEST FAILED
007412  020203                          CMP     R2,R3
007414  001402                          BEQ     .+6
007416  104000                          HLT
007420  000000                          HALT                    ;BACKGROUND TEST FAILED
007422  005767  177572                  TST     JBFLAG          ;ANY JOBS?
007426  001753                          BEQ     BACKGD          ;BRANCH IF NONE
007430  004567  000032                  JSR     R5,SAVALL       ;YES ; EXECUTE JOB WHOSE ADDRESS IS IN JBFLAG
007434  005067  177554                  CLR     NEXJOB
007440  005067  177552                  CLR     NEXJOB+2
007444  016767  177553  170362          MOV     JBFLAG,34
007452  005067  177542                  CLR     JBFLAG
007456  104400                          TRAP                    ;TRAP THROUGH JBFLAG AT 34
007460  004567  000C16                  JSR     R5,RESALL
007464  000734                          BR      BACKGD

                                ;;*****************************************************************
                                ;       SUBROUTINE TO PUSH ALL REGISTERS ONTO THE STACK
                                ;;*****************************************************************

007466  010446                  SAVALL: MOV     R4,-(R6)        ;R5 WAS PUSHED BY JSR
007470  010346                          MOV     R3,-(R6)
007472  010246                          MOV     R2,-(R6)
```

```
                                        MOV     R1,-(R6)
                                        MOV     R0,-(R6)
                                        JMP     @R5)            ;R5 HOLDS RETURN ADDRESS

                                ;;**************************************************************
                                ;       SUBROUTINE TO POP ALL REGISTERS OFF THE STACK
                                ;;**************************************************************

                                RESALL: TST     (R6)+
                                        MOV     @R6)+,R0
                                        MOV     (R6)+,R1
                                        MOV     (R6)+,R2
                                        MOV     (R6)+,R3
                                        MOV     @R6)+,R4
                                        RTS     R5

                                ;;**************************************************************
                                ;       ROUTINE TO SET UP INTERRUPT VECTORS
                                ;;**************************************************************

                                SETVEC: MOV     @DRINV,R0       ;R0 IS VECTOR ADDRESS
                                        MOV     #DRINS,@R0)+    ;PUT SERVICE ADDRESS INTO VECTOR
                                        MOV     DRINL,(R0)      ;PUT PRIORITY INTO VECTOR+2
                                        MOV     #PRINT,30       ;SET UP EMT ADDRESS
                                        MOV     DRINL,32        ;SET UP EMT PRIORITY LEVEL
                                        CLR     34
                                        MOV     DRINL,36        ;SET UP TRAP ADDRESS
                                        CLR     R0              ;INITIALIZE REGISTERS
                                        CLR     R1
                                        CLR     R2
                                        CLR     R3
                                        CLR     R4
                                        CLR     R5
                                        RTS     R7
                                ;;**************************************************************
                                ;       PRIMARY INTERRUPT SERVICE ROUTINE.
                                ;       SETS UP JBLFAG WITH ADDRESS OF JOB TO BE RUNSTARS
                                ;;**************************************************************

                                DRINS:  TST     JBFLAG          ;HAS THE PREVIOUS INTERRUPT BEEN SERVICED?
                                        BEQ     DRINO
                                        HLT
                                        HALT                    ;NO
                                DRINC:  BIT     #DSTATC,@DRST   ;CHECK FOR ERROR
                                        BEQ     DRIN3           ;BRANCH IF NO ERROR
                                        TST     NEXJOB+2        ;IS THERE AN ERROR SERVICE ROUTINE?
                                        BNE     DRIN1           ;BRANCH IF THERE IS.
                                        HLT
                                        HALT                    ;ERROR INTERRUPT, NO ERROR SERVICE.
                                DRIN1:  MOV     NEXJOB+2,JBFLAG ;SET UP JOBFLAG WITH ADDRESS OF SERVICE ROUTINE
                                        RTI
                                DRIN3:  TSTB    @DRST           ;CHECK READY
                                        BMI     DRIN2           ;BRANCH IF SET
                                        HLT
                                        HALT                    ;INTERRUPT WITHOUT ERROR OR READY
                                DRIN2:  TST     NEXJOB          ;IS THERE A READY SERVICE ROUTINE
```

```
 1778  007662  001002                        BNE     .+6             ;BRANCH IF THERE IS.
 1779  007664  104000                        HLT
 1780  007666  000000                        HALT                    ;READY INTERRUPT, NO READY SERVICE
 1781  007670  016767  177730  177322        MOV     NEXJOB,JBFLAG   ;SET UP JOBFLAG WITH SERVICE ROUTINE ADDRESS
 1782  007676  000002                        RTI
 1783
 1784                                  ;;**************************************************** ***********
 1785                                  ;       MASTER'S INTERRUPT SERVICE ROUTINES
 1786                                  ;       ROUTINE A, SEGMENT 0
 1787                                  ;       FILL BUFFER AND TRANSMIT
 1788                                  ;;*************************************************************
 1789  007700  012700  011034        JOBA0:  MOV     #LISTA,R0       ;R0 IS XMIT LIST ADDRESS
 1790  007704  012701  011046                MOV     #LISTA1,R1      ;LISTA1 WILL BE REC LIST
 1791  007710  012021                        MOV     (R0)+,(R1)+     ;START WITH BUS ADDRESSES EQUAL
 1792  007712  012002                        MOV     (R0)+,R2        ;R2 HOLDS WORD COUNT OF XMIT
 1793  007714  010211                        MOV     R2,(R1)         ;MAKE REC WORD COUNT THE SAME
 1794  007716  005402                        NEG     R2              ;MAKE WORD COUNT POSITIVE
 1795  007720  006302                        ASL     R2              ;TRANSFORM INTO BYTE COUNT
 1796  007722  060241                        ADD     R2,-(R1)        ;ADD TO REC BUS ADDRESS
 1797  007724  005010                        CLR     (R0)            ;CLEAR OFFSET IN XMIT LIST
 1798  007726  024040                        CMP     -(R0),-(R0)     ;LEAVE R0=LISTA=XMIT LIST
 1799
 1800  007730  022767  000100  177264        CMP     #100,JBCNT      ;ENOUGH PASSES FOR BELL?
 1801  007736  003010                        BGT     JOBA0A          ;BRANCH IF NOT ENOUGH
 1802  007740  105737  177564        JOBA0B: TSTB    @#177564        ;TTY READY?
 1803  007744  100375                        BPL     JOBA0B
 1804  007746  012737  000207  177556        MOV     #207,@#177566   ;RING BELL
 1805  007754  005067  177242                CLR     JBCNT           ;RESET JOB COUNT
 1806  007760  004767  000704        JOBA0A: JSR     R7,SETBUF       ;FILL UP XMIT BUFFER WITH SPECIAL BINARY COUNT
 1807  007764  012700  011034                MOV     #LISTA,R0
 1808  007770  004767  000370                JSR     R7,MXMIT        ;TRANSMIT DATA TO SLAVE
 1809  007774  012767  010012  177212        MOV     #JOBA1,NEXJOB   ;JOBA1 IS NEXT
 1810  010002  012767  000000  177206        MOV     #0,NEXJOB+2     ;NO ERROR RECOVERY
 1811  010010  000002                        RTI                     ;RETURN TO BACKGROUND VIA TRAP
 1812
 1813                                  ;;*************************************************************
 1814                                  ;       ROUTINE A, SEGMENT 1
 1815                                  ;       FLUSH A BUFFER AND RECEIVE DATA
 1816                                  ;;*************************************************************
 1817
 1818  010012  012700  011046        JOBA1:  MOV     #LISTA1,R0      ;PUT REC LIST ADDRESS INTO R0
 1819  010016  004767  000574                JSR     R7,FLUSH        ;FLUSH BUFFER
 1820  010022  012700  011046                MOV     #LISTA1,R0
 1821  010026  004767  000406                JSR     R7,MREC         ;RECEIVE DATA FROM SLAVE
 1822  010032  012767  010050  177154        MOV     #JOBA2,NEXJOB   ;JOBA2 IS NEXT
 1823  010040  012767  000000  177150        MOV     #0,NEXJOB+2     ;NO ERROR RECOVERY
 1824  010046  000002                        RTI
 1825
 1826
 1827                                  ;;*************************************************************
 1828                                  ;       ROUTINE A, SEGMENT 2
 1829                                  ;       CHECKS TRANSMITTED DATA WITH RECEIVED
 1830                                  ;;*************************************************************
 1831
 1832  010050  012700  011034        JOBA2:  MOV     #LISTA,R0       ;XMIT BUFFER LIST
 1833  010054  012701  011046                MOV     #LISTA1,R1      ;REC BUFFER LIST
 1834  010060  004767  000642                JSR     R7,BUFCHK       ;COMPARE THE TWO BUFFERS
```

```
 1834  010064  042777  000100  170730          BIC     #IE.2DRST       ;GLITCH INTERRUPT
 1835  010072  012777  000100  170722          MOV     #IE.2DRST
 1836  010100  012767  005400  177106          MOV     #JOBAD,NEXJOB   ;REPEAT JOBAD
 1837  010106  012767  000000  177102          MOV     #0,NEXJOB+2
 1838  010114  005267  177102                  INC     JBCNT           ;ADVANCE COUNT
 1839  010120  000002                          RTI
 1840
 1841                                  ;;*****************************************************************
 1842                                  ;       SLAVE'S INTERRUPT SERVICE ROUTINES
 1843                                  ;
 1844                                  ;       JOB1:  IGNORE FIRST READY INTERRUPT
 1845                                  ;;*****************************************************************
 1846
 1847  010122  012767  000000  177064  SJOB1:  MOV     #0,NEXJOB       ;NO MORE READY INTERRUPTS
 1848  010130  012767  010140  177060          MOV     #SJOB2,NEXJOB+2 ;UNTIL ATTN INTERRUPT
 1849  010136  000002                          RTI
 1850
 1851                                  ;;*****************************************************************
 1852                                  ;       JOB2:  WAIT FOR COMMAND
 1853                                  ;;*****************************************************************
 1854
 1855  010140  032777  004000  170654  SJOB2:  BIT     #DSTATC,@DRST   ;TEST FOR INTER
 1856  010146  001002                          BNE     SJOB2A
 1857  010150  104003                          HLT
 1858  010152  000000                          HALT                    ;ERROR OTHER THAN DSTATC
 1859  010154  005001                  SJOB2A: CLR     R1              ;SET UP FOR PARAMETERS
 1860  010156  016702  170640                  MOV     DRST,R2         ;R2 IS STATUS ADDRESS
 1861  010162  012703  000010                  MOV     #FNCT3,R3       ;R3 IS FUNCTION BIT 3
 1862  010166  012704  004000                  MOV     #DSTATC,R4      ;R4 IS INTERUPT BIT
 1863  010172  016705  170626                  MOV     DRDB,R5         ;R5 IS DATA BUFFER ADDRESS
 1864  010176  012700  011062                  MOV     #LISTB+2,R0     ;STORE PARAMETERS HERE STARTING WITH WORD COUNT
 1865  010202  004767  000122                  JSR     R7,HNDSHK       ;GET PARAMETERS
 1866  010206  012700  011060                  MOV     #LISTB,R0       ;R0 IS TOP OF LIST
 1867  010212  016010  000004                  MOV     4(R0),(R0)      ;MOVE OFFSET TO TOP
 1868  010216  066710  170616                  ADD     INBUF,(R0)      ;TOP OF LIST IS BUFFER START + OFFSET
 1869  010222  012077  170572                  MOV     (R0)+,@DRBA     ;SET UP BUS ADDRESS
 1870  010226  012077  170564                  MOV     (R0)+,@DRWC     ;SET UP WORD COUNT
 1871  010232  005077  170564                  CLR     @DRST           ;CLEAR ALL FUNCTION BITS
 1872  010236  032777  002000  170556          BIT     #DSTATB,@DRST   ;WHICH DIRECTION
 1873  010244  001405                          BEQ     SJOB2C          ;BRANCH IF RECIEVE (LEAVE FNCT1 CLEAR FOR DATI'S)
 1874  010246  032777  000400  170546  SJOB2B: BIT     #CYCLE,@DRST    ;WAIT FOR MASTER TO SET CYCLE
 1875  010254  001774                          BEQ     SJOB2B          ;BRANCH IF NOT SET
 1876  010256  000412                          BR      SJOB2D          ;GO DO THE COMAND
 1877  010260  012700  011060          SJOB2C: MOV     #LISTB,R0
 1878  010264  004767  000356                  JSR     R7,BLUSH        ;BLUSH THE BUFFER
 1879  010270  052777  000004  170524          BIS     #FNCT2,@DRST    ;SET FNCT2 FOR DATO'S
 1880  010276  042777  000400  170516          BIC     #CYCLE,@DRST    ;CLEAR CYCLE
 1881  010304  052777  000101  170510  SJOB2D: BIS     #IE!GO,@DRST    ;EXECUTE COMMAND AND INTERRUPT WHEN DONE
 1882  010312  012767  010122  176674          MOV     #SJOB1,NEXJOB   ;IGNORE READY INTERRUPT
 1883  010320  012767  010140  176670          MOV     #SJOB2,NEXJOB+2 ;WAIT FOR ATTN INTERRUPT
 1884  010326  000002                          RTI
 1885
 1886                                  ;;*****************************************************************
 1887                                  ;       SLAVE ROUTINE TO ACCEPT PARAMETERS FROM MASTER
 1888                                  ;;*****************************************************************
 1889
```

```
                                                HNDSHK: MOV     (R5)+,R5        ;ECHO PARAMETER
                                                        MOV     (R5)+,(R0)+     ;STORE PARAMETER
                                                        BIS     R3,(R2)         ;REPLY WITH FNCT3
                                                HNDSH1: BIT     R4,(R2)         ;WAIT FOR ATTN TO DROP
                                                        BNE     HNDSH1
                                                        BIC     R3,(R2)         ;DROP FNCT3
                                                        INC     R1              ;CHECK NUMBER
                                                        CMP     R1,NWRDXF
                                                        BLT     HNDSH2          ;BRANCH IF NOT DONE YET
                                                        RTS     R7
                                                HNDSH2: BIT     R4,(R2)         ;WAIT FOR NEXT WORD
                                                        BEQ     HNDSH2          ;BRANCH IF ATTN CLEAR
                                                        BR      HNDSHK          ;GET ANOTHER PARAMETER

                                                ;;**************************************************************
                                                ;       MASTER TRANSMIT ROUTINE
                                                ;       ENTER WITH TRANSFER LIST IN R0
                                                ;;**************************************************************

                                                MXMIT:  TST     @DRST           ;MAKE SURE ERROR IS CLEAR
                                                        BPL     MXMIT1          ;AND READY IS SET
                                                        HLT
                                                        HALT                    ;ERROR IS SET
                                                MXMIT1: TSTB    @DRST
                                                        BMI     MXMIT2
                                                        HLT
                                                        HALT                    ;READY NOT SET
                                                MXMIT2: MOV     #0,@DRST        ;SET UP FUNCTION FOR DATI'S
                                                        JSR     R7,PRMXFR       ;TRANSFER PARAMETERS OF LIST WHOSE ADDRESS IS IN R0
                                                        BIC     #CYCLE,@DRST    ;MAKE SURE CYCLE IS CLEAR
                                                        BIS     #IE!GO,@DRST    ;EXECUTE COMMAND AND INTERRUPT WHEN DONE
                                                        RTS     R7

                                                ;;**************************************************************
                                                ;       MASTER RECEIVE ROUTINE
                                                ;       ENTER WITH TRANSFER LIST IN R0
                                                ;;**************************************************************

                                                MREC:   TST     @DRST           ;MAKE SURE ERROR IS CLEAR
                                                        BPL     MREC1           ;AND READY SET.
                                                        HLT
                                                        HALT                    ;ERROR SET
                                                MREC1:  TSTB    @DRST
                                                        BMI     MREC2
                                                        HLT
                                                        HALT                    ;READY CLEAR
                                                MREC2:  MOV     #FNCT2,@DRST    ;SET UP FUNCTION FOR DATO'S
                                                        JSR     R7,PRMXFR       ;TRANSFER PARAMETERS OF LIST WHOSE ADDRESS IS IN R0
                                                MREC3:  BIT     #DSTATB,@DRST   ;WAIT FOR SLAVE TO CLEAR DIRECTION
                                                        BNE     MREC3           ;BRANCH IF SET
                                                        BIC     #CYCLE,@DRST    ;CLEAR CYCLE
                                                        BIS     #IE!GO,@DRST    ;EXECUTE COMMAND AND INTERRUPT WHEN DONE.
                                                        RTS     R7

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

```
                                        ;;*****************************************************************
                                        PRMXFR: MOV     (R0)+,2DRBA     ;FIRST WORD IN LIST IS ADDRESS
                                                MOV     (R0),2DRWC      ;SECOND WORD IN LIST IS WORD COUNT
                                                CLR     R1              ;R1 COUNTS PARAMETERS TRANSFERRED
                                                MOV     DRST,R2         ;R2 IS THE STATUS ADDRESS
                                                MOV     #FNCT3,R3       ;R3 USED FOR FUNCTION BIT 3
                                                MOV     #DSTATC,R4      ;R4 USED FOR INTERUPT BIT
                                                MOV     DRDB,R5         ;R5 IS THE DATA BUFFER ADDRESS
                                        PRMXF1: MOV     (R0),(R5)       ;SET UP DRDB WITH PARAMETER
                                                BIS     R3,(R2)         ;CALL SLAVE'S ATTN
                                        PRMXF2: BIT     R4,(R2)         ;WAIT FOR REPLY
                                                BEQ     PRMXF2          ;BRANCH IF ATTN CLEAR
                                                CMP     (R0)+,(R5)      ;COMPARE PARAMETER SENT WITH SLAVE'S ECHO
                                                BEQ     PRMXF3          ;BRANCH IF EQUAL
                                                HLT
                                                HALT                    ;PARAMETER DID NOT ECHO
                                        PRMXF3: BIC     R3,(R2)         ;DROP SLAVE'S ATTN
                                        PRMXF4: BIT     R4,(R2)         ;WAIT FOR REPLY
                                                BNE     PRMXF4          ;BRANCH IF ATTN SET
                                                INC     R1              ;ADVANCE PARAMETER COUNT
                                                CMP     R1,NUMDXF       ;ALL PARAMETER XFERRED?
                                                BLT     PRMXF1          ;BRANCH IF NOT DONE
                                                RTS     R7              ;RETURN WHEN ALL PARAMETERS TRANSFERRED AND CHECKED.

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

                                        FLUSH:  CLR     R5              ;SET R5 TO ZIP
                                                JSR     R7,BSETUP       ;SET UP REGISTERS
                                        FLUSH1: JSR     R7,BUFPUT       ;STORE ITEM IN BUFFER
                                                BLT     FLUSH1
                                                BR      BUFOUT          ;STOP WHEN BUFFER FULL

                                        BUFPUT: MOV     R5,(R1)+        ;PUT R5 INTO BUFFER
                                                ADD     R5,R3           ;INCLUDE IN CHECKSUM
                                                ADC     R4
                                                INC     R2              ;ADVANCE WORD COUNT
                                                RTS     R7              ;RETURN WITH STATUS SET

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

                                        ;REGISTER SETUP ROUTINE
                                        BSETUP: MOV     (R0)+,R1        ;R1 IS BUS ADDRESS
                                                MOV     (R0)+,R2        ;R2 IS WORD COUNT
                                                TST     (R0)+           ;SKIP OVER OFFSET
                                                CLR     R3              ;CLEAR LOW CHECKSUM
                                                CLR     R4              ;CLEAR HIGH CHECKSUM
                                                RTS     R7              ;RETURN
```

```
                                ;;*****************************************************************
                                ;       ROUTINE TO FILL BUFFER WITH SPECIAL BINARY COUNT
                                ;       ENTER WITH R0 POINTING TO TRANSFER LIST
                                ;;*****************************************************************
010670  004767  177760          SETBUF: JSR     R7,BSETUP       ;SET UP REGISTERS
010674  005005                  CLR     R5
010676  004767  177732          SETBF1: JSR     R7,BUFPUT       ;NUMBER TO BUFFER
010702  002006                  BGE     BUFOUT
010704  005105                  COM     R5
010706  004767  177722          JSR     R7,BUFPUT       ;COMPLEMENT OF NUMBER TO BUFFER
010712  002002                  BGE     BUFOUT
010714  005405                  NEG     R5              ;INCREMENT NUMBER
010716  000767                  BR      SETBF1
010720  010320                  BUFOUT: MOV     R3,(R0)+        ;MOVE LOW CHECK TO LIST
010722  010420                  MOV     R4,(R0)+        ;MOVE HIGH CHECK TO LIST
010724  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
                                ;;*****************************************************************
010726  010046                  BUFCHK: MOV     R0,-(R6)        ;SAVE LIST#2 ON STACK
010730  010146                  MOV     R1,-(R6)        ;SAVE LIST#1 ON STACK
010732  004767  000036          JSR     R7,CHKSUM       ;VERIFY INTEGRITY OF CHECK BUFFER (#2)
010736  012600                  MOV     (R6)+,R0        ;RECOVER 1ST LIST POINTER
010740  012001                  MOV     (R0)+,R1        ;BUS ADDRESS #1
010742  012002                  MOV     (R0)+,R2        ;WORD COUNT #1
010744  012600                  MOV     (R6)+,R0        ;RECOVER 2ND LIST POINTER
010746  012003                  MOV     (R0)+,R3        ;BUS ADDRESS #2
010750  020220                  CMP     R2,(R0)+        ;COMPARE WORD COUNTS
010752  003402                  BLE     BUFCK1          ;BRANCH IF EQUAL OR LESS THAN
010754  104000                  HLT                     ;BUFFER 2 IS LONGER THAN !
010756  000000                  HALT

010760  022123                  BUFCK1: CMP     (R1)+,(R3)+     ;COMPARE BUFFERS
010762  001401                  BEQ     BUFCK2
010764  104000                  HLT                     ;DATA ERROR
010766  005202                  BUFCK2: INC     R2              ;ADVANCE COUNT
010770  002773                  BLT     BUFCK1          ;BRANCH IF NOT DONE
010772  000207                  RTS     R7              ;RETURN; STACK IS CLEAR

                                ;;*****************************************************************
                                ;       ROUTINE TO CHECK SUM OF BUFFER
                                ;       ENTER WITH R0 POINTING TO TRANSFER LIST
                                ;;*****************************************************************
010774  004767  177654          CHKSUM: JSR     R7,BSETUP       ;SET UP REGISTERS
011000  004767  000016          CHKSM1: JSR     R7,GETBUF       ;GET ITEM FROM BUFFER
011004  002775                  BLT     CHKSM1          ;BRANCH IF NOT DONE
011006  020320                  CMP     R3,(R0)+        ;COMPARE LOW ORDER CHECKS
011010  001003                  BNE     CHKSM2
011012  020420                  CMP     R4,(R0)+        ;COMPARE HIGH ORDER CHECKS
011014  001001                  BNE     CHKSM2
```

```
 2058  011016  000207                      RTS     R7              ;RETURN IF CHECKSUM OK.
 2059  011020  104000            CHKSM2:   HLT                     ;ORIGINAL BUFFER CHECKSUM DOES NOT AGREE WITH PRESENT
 2060
 2061  011022  012105            GETBUF:   MOV     (R1)+,R5        ;GET ITEM OUT OF BUFFER
 2062  011024  060503                      ADD     R5,R3           ;ADD TO CHECKSUM
 2063  011026  005504                      ADC     R4
 2064  011030  005202                      INC     R2              ;ADVANCE WORD COUNT
 2065  011032  000207                      RTS     R7
 2066
 2067  011034  013570            LISTA:    XINBUF                  ;START OF XMIT BUFFER
 2068  011036  177605                      -123.                   ;WORD COUNT
 2069  011040  000000                      0                       ;OFFSET
 2070  011042  000000                      0                       ;CHECKSUM LOW
 2071  011044  000000                      0                       ;CHECKSUM HIGH
 2072
 2073  011046  000000            LISTA1:   0                       ;START OF REC BUFFER
 2074  011050  000000                      0                       ;WORD COUNT
 2075  011052  000000                      0                       ;OFFSET
 2076  011054  000000                      0                       ;CHECKSUM LOW
 2077  011056  000000                      0                       ;CHECKSUM HIGH
 2078
 2079  011060  013570            LISTB:    XINBUF                  ;SLAVE'S ECHO BUFFER
 2080  011062  000000                      0
 2081  011064  000000                      0
 2082  011066  000000                      0
 2083  011070  000000                      0
 2084
 2085
 2086                            ;;*****************************************************************
 2087                            ;       ENTERED WITH SYSTEM TRAP CALL(HLT)
 2088                            ;       PRINT OUT THE ERROR PC AND STATUS REGISTER
 2089                            ;;*****************************************************************
 2090
 2091
 2092  011072  004767  000654   PRINT:   JSR     %7,CKSWR
 2093  011076  037727  167710  020000      BIT     @SR,#20000      ;TEST FOR INHIBIT PRINT OU
 2094  011104  001401                      BEQ     .+4             ;BRANCH TO PRINT
 2095  011106  000002                      RTI                     ;INHIBIT, RETURN TO MAIN STREAM
 2096  011110  012667  000172             MOV     (6)+,SAVPC      ;PC OF FAILING ROUTINE
 2097  011114  012667  000170             MOV     (6)+,SAVCC      ;CC OF ERROR CONDITION
 2098  011120  024646                      CMP     -(6),-(6)       ;REPOSITION THE STACK
 2099  011122  012777  000215  167734      MOV     #215,@TPB       ;CR
 2100  011130  105777  167726             TSTB    @TPS
 2101  011134  100375                      BPL     .-4
 2102  011136  012777  000212  167720      MOV     #212,@TPB       ;LINE FEED
 2103  011144  105777  167712             TSTB    @TPS
 2104  011150  100375                      BPL     .-4
 2105  011152  010267  000122             MOV     %2,SAVR2        ;SAVE R2
 2106  011156  010367  000120             MOV     %3,SAVR3        ;SAVE R3
 2107  011162  010467  000116             MOV     %4,SAVR4        ;SAVE R4
 2108  011166  016702  000114             MOV     SAVPC,%2
 2109  011172  004767  000114             JSR     %7,PRTAB        ;PRINT OCTAL NUMBER
 2110  011176  012777  000240  167660      MOV     #240,@TPB
 2111  011204  105777  167652             TSTB    @TPS            ;SPACE BETWEEN WORDS
 2112  011210  100375                      BPL     .-4
 2113  011212  016702  000072             MOV     SAVCC,%2
```

```
2114  011216  004767  000070                      JSR     %7,PRTAB        ;PRINT OCTAL NUMBER
2115  011222  012777  000240  167634              MOV     #240,@TPB       ;PRINT SPACE
2116  011230  105777  167626                      TSTB    @TPS            ;PRINTER DONE
2117  011234  100375                              BPL     .-4             ;BRANCH WHEN NOT DONE
2118  011236  017702  167560                      MOV     @DRST,%2        ;GET DR11B STATUS
2119  011242  004767  000044                      JSR     %7,PRTAB        ;PRINT OCTAL NUMBER
2120  011246  016702  000026                      MOV     SAVR2,%2
2121  011252  016703  000024                      MOV     SAVR3,%3
2122  011256  016704  000022                      MOV     SAVR4,%4
2123  011262  004767  000464                      JSR     %7,CKSWR
2124  011266  005777  167520                      TST     @SR             ;CHECK SR FOR HALT SWITCH
2125  011272  100001                              BPL     .+4
2126  011274  000000                              HALT                    ;HALT ON ERROR UP
2127  011276  000002                              RTI                     ;RETURN TO MAINLINE
2128  011300  000000                  SAVR2:      0
2129  011302  000000                  SAVR3:      0
2130  011304  000000                  SAVR4:      0
2131  011306  000000                  SAVPC:      0
2132  011310  000000                  SAVCC:      0
2133
2134  011312  005067  000260          PRTAB:      CLR     BINCT
2135  011316  005067  000252                      CLR     WGTCT
2136  011322  012704  011602                      MOV     #LIST,%4        ;GET LIST ADDRESS
2137  011326  142777  000177  167526              BICB    #177,@TPS       ;CLR INT FLAG
2138  011334  012767  000005  000236              MOV     #5,ASCNT
2139  011342  012767  000007  000220              MOV     #7,SEVEN
2140  011350  012767  000001  000214              MOV     #1,DECML
2141  011356  105777  167500          WAIT1:      TSTB    @TPS
2142  011362  100375                              BPL     WAIT1
2143  011364  005702                              TST     %2
2144  011366  100404                              BMI     MINUS           ;NEG SIGN PRINT 1
2145  011370  012777  000260  167466              MOV     #260,@TPB       ;POS SIGN PRINT 0
2146  011376  000403                              BR      START
2147  011400  012777  000261  167456  MINUS:      MOV     #261,@TPB
2148  011406  016703  000156          START:      MOV     SEVEN,%3        ;PUT MASK IN R3
2149  011412  010267  000150                      MOV     %2,TOODLE       ;GET READY TO DOODLE NUMBER IN TOODLE
2150  011416  005167  000144                      COM     TOODLE          ;COMPENSATES FOR COMPLEMENT DURING BIC
2151  011422  046703  000140                      BIC     TOODLE,%3       ;AND IN OCTAL CHARACTER
2152  011426  001410                              BEQ     WRTOC           ;ZERO, WRITE 0 IN LIST
2153  011430  066767  000136  000136  MKNUM:      ADD     DECML,WGTCT     ;COUNT UP TO
2154  011436  005267  000134                      INC     BINCT           ;AND RECORD
2155  011442  026703  000126                      CMP     WGTCT,%3        ;SAME BINARY WEIGHT
2156  011446  001370                              BNE     MKNUM           ;KEEP COUNTN
2157  011450  062767  000260  000120  WRTOC:      ADD     #260,BINCT      ;ADD ASCII PREFIX
2158  011456  016724  000114                      MOV     BINCT,(4)+      ;WRITE ASCII CHAR IN LIST
2159  011462  066767  000102  000102              ADD     SEVEN,DECML     ;EXPAND BINARY WEIGHT
2160  011470  005067  000100                      CLR     WGTCT
2161  011474  005067  000076                      CLR     BINCT
2162  011500  005367  000074                      DEC     ASCNT
2163  011504  001410                              BEQ     XLIST           ;5 CHAR IN LIST
2164  011506  012703  000003                      MOV     #3,%3           ;SET X3 FOR ADD LOOP
2165  011512  066767  000052  000050  MORDD:      ADD     SEVEN,SEVEN     ;MAKING SEVENTY BY SEVEN
2166  011520  005303                              DEC     %3
2167  011522  001373                              BNE     MORDD
2168  011524  000730                              BR      START           ;NX SEVEN SET GET NX OCTAL
2169  011526  012767  000005  000044  XLIST:      MOV     #5,ASCNT        ;SEND 5 CHAR TO TTY
```

```
011534  105737  167322          WAIT2:  TSTB    @TPS
011540  100375                          BPL     WAIT2
011542  114437  167316                  MOV     -(4),@TPB
011546  005367  000026                  DEC     ASCNT
011552  001402                          BEQ     HOFHM            ;FINISH PRINTING GET NXT NUM
011554  000767                          BR      WAIT2
011556  105737  167300          HOFHM:  TSTB @TPS
011562  100375                          BPL     .-4
011564  000207                          RTS     %7               ;HEAD FOR HOME
011566  000000                  TOGGLE: 0
011570  000000                  [illegible]EN: 0
011572  000000                  DECML:  0
011574  000000                  [illegible]: 0
011576  000000                  [illegible]: 0
011600  000000                  ASCNT:  0
011602  000000                  LAST:   0
011604  000000                          0
011606  000000                          0
011610  000000                          0
011612  000000                          0

                                ;;*************************************************************
                                ;       SCOPE LOOP ROUTINE ENTERED BY USER TRAP
                                ;;*************************************************************

011614  004767  000132          SCOPEA: JSR     %7,CKSWR
011620  032777  040000  167164          BIT     #40000,@SR
011626  001003                          BNE     SCOPEB           ;SCOPE, BIT IS A ONE
011630  011667  000100                  MOV     @%6,RETURN       ;NO - SAVE PC FOR NEXT TIME
011634  000002                          RTI                      ;RETURN IN SEQUENCE
011636  022626                  SCOPEB: CMP     (6)+,%6          ;REPOSITION THE STACK
011640  012677  167150                  MOV     (6)+,@PSW
011644  000177  000064                  JMP     @RETURN          ;SCOPE RETURN

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

011650  004767  000076          SCOPEC: JSR     %7,CKSWR
011654  032777  040000  167130          BIT     #40000,@SR       ;TEST SR FOR SCOPE
011662  001365                          BNE     SCOPEB           ;YES SCOPE
011664  004767  000062                  JSR     %7,CKSWR
011670  032777  004000  167114          BIT     #4000,@SR        ;NO - TEST FOR ITERATION
011676  001007                          BNE     SCOPEG           ;INHIBIT ITERATION
011700  026767  000026  000022          CMP     SCOPEF,ICOUNT
011706  001403                          BEQ     SCOPEG           ;EXIT - DONE
011710  005267  000016                  INC     SCOPEF           ;INCREMENT COUNT
011714  000750                          BR      SCOPEB           ;LOOP SOME MORE
011716  005067  000010          SCOPEG: CLR     SCOPEF           ;CLEAR COUNT
011722  011667  000006                  MOV     @%6,RETURN       ;SAVE SCOPE RETURN POINTER
011726  000002                          RTI                      ;RETURN INLINE-NEXT TEST
011730  004000                  ICOUNT: 4000
011732  000000                  SCOPEF: 0                        ;COUNT LOCATION FOR ITERATION LOOP
011734  011156                  RETURN: BEGIN                    ;ADDRESS OF LAST TEST
                                        .EVEN
```

```
011736  000167  156236                    JMP     200


                                ;;*****************************************************************
                                ;       CHECK SWITCH REGISTER ROUTINE. CHECKS FOR ^G TO ALLOW CHANGING
                                ;       OF LOC. 176.
                                ;;*****************************************************************
011742  000000                  TEMPST: .WORD   0
011744  000000                  COUNT:  .WORD   0
011746  000000                  RCSW:   .WORD   0
011750  000000                  TIB:    .WORD   0

011752  022767  000176  167032  CKSWR:  CMP     @#SWREG,SR      ;SOFTWARE SWITCH REGISTER PRESENT
011760  001133                  BNE     OUT
011762  105767  167070                  TSTB    @#TKS           ;YES WAIT FOR
011766  100130                  BPL     OUT                     ;READY, GET CHARACTER
011770  016767  167064  177752          MOV     @#TKB,TIB       ;AND STRIP OFF
011776  042767  177600  177744          BIC     #177600,TIB     ;THE GARBAGE
012004  022767  000007  177736          CMP     #7,TIB          ;IS IT A ^G?
012012  001115                  BNE     OUT
012014  012702  012324                  MOV     #$CNTG,R2
012020  004767  000436                  JSR     PC,TTOUT
012024  012702  012336          CNTLU:  MOV     #$MSWR,R2
012030  004767  000426                  JSR     PC,TTOUT
012034  016702  177552                  MOV     @#SR,R2
012040  004767  177414                  JSR     R7,PRTAB
012044  012702  012346                  MOV     #$MNEW,R2
012050  004767  000406                  JSR     PC,TTOUT
012054  005037  011742                  CLR     @#TEMPST
012060  005067  177656          $READ:  CLR     TEMPST
012064  012767  000007  177652          MOV     #7,COUNT
012072  004767  000154          1$:     JSR     PC,TTIN         ;GO  READ A CHARACTER
012076  042767  177600  177644          BIC     #177600,TIB     ;STRIP OFF GARBAGE
012104  122767  000025  177636          CMPB    #25,TIB         ;IS IT A ^U?
012112  001001                  BNE     2$                      ;BRANCH IF NOT
012114  000743                  BR      CNTLU                   ;START OVER
012116  122767  000015  177624  2$:     CMPB    #15,TIB         ;IS IT A <CR>?
012124  001011                  BNE     4$                      ;BRANCH IF NOT
012126  012702  012332                  MOV     #$CRLF,R2
012132  004767  000324                  JSR     R7,TTOUT
012136  022767  000007  177620          CMP     #7,COUNT        ;WAS IT FIRST CHARACTER
012144  001036                  BNE     7$                      ;CHANGE SWR IF NOT FIRST ONE
012146  000440                  BR      OUT                     ;GET OUT
012150  122767  000060  177572  4$:     CMPB    #60,TIB
012156  003004                  BGT     5$
012160  122767  000067  177562          CMPB    #67,TIB
012166  002005                  BGE     6$
012170  012702  012357          5$:     MOV     #$QUEST,R2
012174  004767  000262                  JSR     PC,TTOUT
012200  000745                  BR      3$                      ;START OVER IF NOT LEGAL CHARACTER
012202  006367  177534          6$:     ASL     TEMPST
012206  006367  177530                  ASL     TEMPST
012212  006367  177524                  ASL     TEMPST
012216  142767  000060  177524          BICB    #60,TIB         ;GET NITTY-GRITTY
012224  156767  177520  177510          BISB    TIB,TEMPST
012232  005367  177506                  DEC     COUNT           ;ONLY WANT 6   DIGITS
```

```
                                        BEQ     5$
                                        JSR     1$
                    177474  166542  7$:     MOV     TEMPST,@SR      ;CHANGE SWITCH REGISTER CONTENTS
                    000207  OUT:    RTS     %7                      ;RETURN TO PROGRAM
                            ;;**********************************************************************
                            ;       TTY READ SUBROUTINE**********
                            ;;**********************************************************************

                    166600  TTIN:   CLR     @TKS
                    166576          CLR     @TKB
                    177462          CLR     TIB
                    166564          INC     @TKS
                    105777  166560  TTIN1:  TSTB    @TKS
                    100375          BPL     TTIN1
                    166554  177442          MOV     @TKB,TIB
                    105777  166550  TTIN2:  TSTB    @TPS
                    100375          BPL     TTIN2
                    177430  166542          MOVB    TIB,@TPB

                    000207                  RTS     %7
                    057137  020107  000046  $CNTG:  .ASCIZ  '<7G 3'
                    020137  000046  $CRLF:  .ASCIZ  '< 3'
                    051127  020075  $MSWR:  .ASCIZ  '<SWR= 3'
                    000046
                    020040  042516  036527  $MNEW:  .ASCIZ  '  NEW= 3'
                    023040      000
                    137     020077  023137  $QUEST: .ASCIZ  '<? <3'
                    000
                    137     051104  030461  $DR11:  .ASCIZ  '<DR11B OK   3'
                    020040  045517  020040
                    000
                    137     046440  044501  $MAIN:  .ASCIZ  '< MAINDEC-11-D2DRB-D <3'
                    041040  041505  030455
                    026462  055104  051104
                    020104  023137
                    000
                    137     042040  030522  $HEAD:  .ASCIZ  '< DR11B LOGIC TEST 3'
                    041061  046040  043517
                    041511  052040  051505
                    020124  000046

                                    .EVEN

                    000000  CFL:    0                               ;FIRST CHAR FLAG

                            ;;**********************************************************************
                            ;       TTY ASCII OUTPUT ROUTINE
                            ;;**********************************************************************

                    105712  TTOUT:  TSTB    (2)             ;CHECK FOR NULL CHARACTER
                    001403          BEQ     1$              ;IF NOT, TYPE THE CHARACTER
                    122712  000046          CMPB    #'&,(2)         ;CHECK FOR TERMINATOR
                    001005          BNE     .EMPTY
```

```
                                .BIC    #100.,@TPS
                                CLR     %2                      ;CLEAR POINTER TO CHARACTER
                                RTS     PC                      ;RETURN
000137'                 .EMPTY: CMPB    #'^,(2)                 ;CR,LF CHAR?
                                BEQ     .RET
000041                          CMPB    #'!,(2)                 ;CHECK FOR RETURN TERMINATOR
                                BEQ     .REST
166334                  1$:     TSTB    @TPS
                                BPL     1$
166330                          MOVB    (2)+,@TPB               ;TYPE CHARACTER
                                BR      TTOUT
                        .RET:   INC     %2
000020                          MOV     %2,.SAV                 ;SET UP NEW POINTER
012560                          MOV     #.RETR,%2
                                BR      .RET-6
000006                  .REST:  MOV     .SAV,%2
000741                          BR      TTOUT

012560      015         012     041 .RETR:  .BYTE   15.,12.,'!
012564                          .EVEN
012564      000000              .SAV:   0
013566                          .=.+1000
013566      000000              BUFF:   0                       ;FOR STACK POINTER 100 LOCATIONS
013570      013566      XINBUF: .
                                .=.+1000
014572      014572      XCHKBU: .
000001                          .END
```

F04


```
$$$$    011620          2139*   2162*   2169*   2173*   2184*
$$$$ =  000000          2164#
$$$$    000000          1665    1696#   1705    1713
$$$$    000000          1208    1214#
$$$$    000000          1182    1188#
$$$$    000000           551     553#    554    1590    1604    2224
$$$$    000000          1482    1502#
$$$$    000000          2134*   2154*   2157*   2158    2161*   2163#
$$$$    000000           465#   1303    1379    1406    1484
$$$$    000000           466#    639     640     643     644     753     779     957
$$$$    000000           467#    975
$$$$    000000           476#    994
$$$$    000000           477#    736     739     742     743     774     800
$$$$    000000           478#    995
$$$$    000000           479#   1000    1002    1003    1168    1195    1221
$$$$    000000           480#
$$$$    000000           467#    656     657     660     661     756     781     975
$$$$    000000           468#    673     674     677     678     759     784     983
$$$$    000000           469#    686     687     690     691     703     704     762     787
$$$$    000000           470#    699     700     755     790
$$$$    000000           471#    712     713     716     717     758     794     893     895     912     914     932     934
$$$$    000000           951    1513    1560
$$$$    000000           472#    885     899     904     909     924     928     943     947    1291
$$$$    000000           473#    725     726     729     730     771     797
$$$$    000000           474#    968
$$$$    000000          1878    1932#
$$$$    000000          1485    1489#
$$$$    000000           530#   1378*   1379    1405*   1406    1483*   1484
$$$$    000000          1977    1996#   2008    2051
$$$$    000000          1833    2027#
$$$$    000000          2036    2040#   2044
$$$$    000000          2041    2043#
$$$$    000000           496    1657    1673    2360#
$$$$    000000           528#   1076*   1078*   1079    1097*   1099*   1100    1116*   1118    1135*   1137*   1138    1357*
$$$$    000000          1369    1393*   1395*   1396    1418*   1424*   1444*   1452*   1453    1471*   1472    1497    1509
$$$$    000000          1523    1524    1540    1554
$$$$    000000          1980    2011    2014    2017#
$$$$    000000          1978    1982#   2010    2013
$$$$    000000           482#    563*    574*
$$$$    000000          1505#   1511
$$$$    000000          1421    1456    1475    1502#
$$$$    000000           527#   1502    1533
$$$$    000000          2052#   2053
$$$$    000000          2055    2057    2059#
$$$$    000000          2029    2061#
$$$$    000000           585     601     817     887     906     926     945    1228    1241    1289    1582    2092    2123
$$$$    000000          2195    2209    2212    2238#
$$$$    000000           552    2248#   2261
$$$$    000000          1536#   1541
$$$$    000000          1550#   1555
$$$$    000000          2234#   2256*   2266    2281*
$$$$    000000          1636#   1874    1880    1919    1939
$$$$    000000          1446    1465    1490    1533#
$$$$    000000          1380    1384#
$$$$    000000          1110    1148    1412    1547#
$$$$    000000          1407    1411#
```

```
                        822     832     836     845     949     960     973     991     997     910     916     930     935
                        949     953     966     973     978     981     985     993     999    1005    1009    1021
                       1026    1029    1032    1053    1058    1061    1065    1091    1130    1161    1164    1167    1170
                       1188    1191    1194    1198    1201    1205    1213    1217    1220    1224    1227    1232    1245
                       1255    1264    1268    1273    1293    1296    1305    1318    1322    1329    1343    1346    1355
                       1368    1387    1438    1516    1519    1522    1528    1539    1553    1558    1563    1566    1694
                       1698    1702    1763    1769    1775    1779    1857    1911    1915    1929    1933    1961    2037
                       2042    2059
HNDSHK  010330         1865    1890*   1902
HNDSH1  010336         1893*   1894
HNDSH2  010356         1898    1900*   1901
ICOUNT  011730          593*    614*    809*    828*    855*    883*   1179*   1239*   1251*   1274*   1302*   1313*   2215
                       2222*
IE    = 000100         1634*   1663    1679    1834    1835    1881    1920    1940
INBUF   001040          526*   1082    1103    1121    1141    1315    1372    1399    1419    1425    1442*   1445*   1458
                       1477    1493    1525    1534    1548    1869
INBUF1  001070          538*   1425*   1445
INCBA   002534          871*    876
INCDB   005144         1277*   1282
INCWC   002504          858*    863
INTA    006556         1084    1105    1123    1143    1374    1401    1426    1460    1479    1513*
INTB    003464         1014    1023*
INTC    003636         1046    1055*
IOCNT   007222         1651*   1656*   1800    1805*   1838*
IOFLAG  007220         1650*   1659*   1675*   1704    1709    1710*   1761    1771*   1791*
IOBAD   007700         1660    1799*   1836
IOBADA  007760         1801    1806*
IOBADB  007740         1802*   1803
IOBA1   010012         1809    1818*
IOBA2   010050         1822    1831*
LOEXIT  006510         1498    1501*
LENCHK  001046          529*   1494*   1496*   1497    1499    1503*   1507*   1508    1535*   1536*   1540    1549*   1550*
                       1554
LIST    011602         2136    2185*
LISTA   011034         1789    1807    1831    2067*
LISTA1  011046         1790    1818    1820    1832    2073*
LISTB   011060         1864    1666    1877    2079*
LOADA   006466         1496*   1500
LOOBUF  006454         1077    1098    1117    1136    1368    1394    1420    1455    1474    1493*
MAINT = 010000         1640*
MFCHK   006164         1441    1444*
MFLOOP  006056         1426*   1443
MINUS   011400         2144    2147*
MKNUM   011430         2153*   2156
MOADD   011512         2165*   2167
MREC    010440         1821    1927*
MREC1   010452         1928    1931*
MREC2   010464         1932    1935*
MREC3   010476         1937*   1938
MSTART  001000          512*
MSX     001006          512     514*
MS1     007224          514    1655*
MXMIT   010364         1808    1909*
MXMIT1  010376         1910    1913*
MXMIT2  010410         1914    1917*
NEX   = 040000         1642*
```

```
NEXCHK  004436  1156  1162#
NEXJOB  007214  1648#  1660*  1661*  1676*  1677*  1707*  1708*  1767  1771  1777  1781  1809*  1810*
                1822*  1823*  1836*  1837*  1947*  1848*  1882*  1883*
NOP     =:000240  462#
NORMAL  006713  1033  1066  1172  1233  1361  1530  1543#
NPRDY   003372  996  1010#
NPR1    001034  524#  1011  1013*  1027  1043  1044*  1059  1063
NXRDXF  004212  1647#  1697  1967
N1413   003356  1001  1006#
OFL     012460  2326#
OUT     012250  2239  2241  2245  2268  2285#
PC      =:000007  552*  1625#  2247*  2249*  2253*  2257*  2274*
PRINT   011072  488  1745  2092#
PRMXFR  010524  1918  1936  1948#
PRMXF1  010556  1955#  1968
PRMXF2  010562  1957#  1959
PRMXF3  010576  1960  1963#
PRMXF4  010600  1964#  1965
PRTAB   011312  2109  2114  2119  2134#  2251
PSW     001014  497*  516#  553*  884*  903*  923*  942*  1016*  1048*  1086*  1107*  1125*  1145*
                1158*  1184*  1210*  1340*  1376*  1403*  1428*  1462*  1481*  1545*  1589*  1600*  1603*
                1662*  1664*  1678*  1680*  2201*
P4INT   003116  950  954#
P4INV   003076  944  950#
P5ERR   003034  931  936#
P5INV   003006  925  931#
P6ERR   002744  911  916#
P6INV   002716  905  911#
P7ERR   003654  892  897#
P7INV   002626  886  892#
RDSW    011746  2235#
RDYCHK  001054  532#  1323*  1326*
READY   =:000200  1635#
RESALL  007502  1712  1730#
RETURN  011734  554*  2198*  2202  2220*  2224#
R0      =%000000  1617#  1686*  1692  1723  1731*  1742*  1743*  1744*  1749*  1789*  1791  1792  1797*
                1798  1807*  1818*  1820*  1831*  1864*  1866*  1867*  1868*  1969  1970  1977*  1991*
                1948  1949  1955  1959  1996  1997  1998  2017*  2018*  2027  2030*  2031  2032
                2033*  2034  2035  2054  2056
R1      =%000001  1618#  1687*  1696  1722  1732*  1750*  1790*  1791*  1793*  1796*  1832*  1859*  1896*
                1897  1950*  1966*  1967  1982*  1996*  2028  2031*  2040  2061
R2      =%000002  1619#  1688*  1700  1721  1733*  1751*  1792*  1793  1794*  1795*  1796  1860*  1892*
                1893  1895*  1900  1951*  1956*  1957  1963*  1964  1985*  1997*  2032*  2035  2043*
                2064*
R3      =%000003  1620#  1689*  1700  1720  1734*  1752*  1861*  1892  1895  1952*  1956  1963  1983*
                1999*  2017  2034*  2040  2054  2062*
R4      =%000004  1621#  1690*  1696  1719  1735*  1753*  1862*  1893  1900  1953*  1957  1964  1984*
                2000*  2018  2056  2063*
R5      =%000005  1622#  1691*  1692  1706*  1712*  1724  1736*  1754*  1863*  1890*  1891  1954*  1955*
                1959  1976*  1982  1983  1992*  2009*  2012*  2015*  2061*  2062
R6      =%000006  1623#  1657*  1673*  1719*  1720*  1721*  1722*  1723*  1730  1731  1732  1733  1734
                1735  2027*  2028*  2030  2033
R7      =%000007  1624#  1658*  1674*  1755*  1806*  1808*  1819*  1821*  1833*  1865*  1878*  1999*  1919*
                1921*  1936*  1941*  1969*  1977*  1978*  1996*  2001*  2008*  2010*  2013*  2019*  2029*
                2045*  2051*  2052*  2058*  2065*
SAVALL  007466  1706  1719#
```

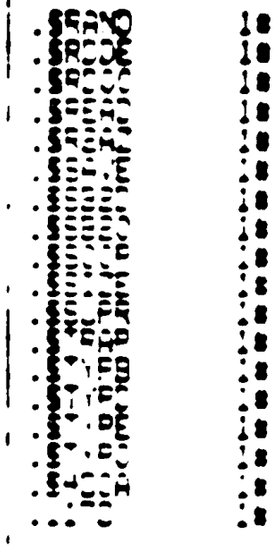
```
SAVCC   011310          2097*   2113    2132*
SAVPC   011306          2096*   2108    2131*
SAVR2   011300          2105*   2120    2128*
SAVR3   011302          2106*   2121    2129*
SAVR4   011304          2107*   2122    2130*
SCOPE = 104405           463*    562     575     590     599     613     625     638     655     672     685     698     711
                         724     737     750     808     827     841     854     868     882     900     922     941     963
                         994    1041    1075    1096    1115    1134    1153    1178    1238    1250    1260    1273    1293
                        1301    1312    1335    1366    1392    1417    1451    1470    1491
SCOPEA  011614          2195*
SCOPEB  011636          2197    2200*   2211    2218
SCOPEC  011650           491    2209*
SCOPEF  011732          2215    2217*   2219*   2223*
SCOPEG  011716          2214    2216    2219*
SETBF1  010626          2010*   2016
SETBUF  010670          1806    2008*
SETVEC  007520          1658    1674    1742*
SEVEN   011570          2139*   2148    2159    2165*   2180*
SJOB1   010122          1676    1847*   1922
SJOB2   010140          1677    1848    1855*   1833
SJOB2A  010154          1856    1959*
SJOB3B  010246          1874*   1875
SJOB3C  010260          1873    1877*
SJOB2D  010304          1876    1891*
SP     =%000006          540*    541*    546     548     549    1626*
SR      001012           515*    543     547*    550    1583    2093    2124    2196    2210    2213    2238    2250    2294*
SSTART  001002           513*
SSI     007304           513    1672*
START   011406          2146    2148*   2168
SUSWR   001072           503     540*
SXPEG   000176           494*    547     550    2238
TEMPST  011742          2233*   2254*   2255*   2276*   2277*   2278*   2280*   2284
TIB     011750          2236*   2242*   2243*   2244    2258*   2259    2262    2269    2271    2279*   2280    2294*   2298*
                        2301
TKB     001060           534*   2242    2293*   2298
TKS     001056           533*   1342*   2240    2292*   2295*   2296
TNPRC   003542          1035    1041*   1070
TNPR1   003306           995*   1037
TOGGLE  011566          2149*   2150*   2151    2179*
TPB     001064           536*   2099*   2102*   2110*   2115*   2145*   2147*   2172*   2301*   2347*
TPS     001062           535*   2100    2103    2111    2116    2137*   2141    2170    2176    2299    2338*   2345
TRPA    007122          1586    1590*
TRPB    007126          1591*   1601*
TRTRAP  007056          1582*
TSTRDY  005320          1324*   1328
TTIN    012252          2257    2292*
TTINI   012272          2296*   2297
TTIN2   012306          2299*   2300
TTOUT   012462           500     502    1576    2247    2249    2253    2265    2274    2334*   2348    2354
T33CLR  003534          1022    1036*
T34CLR  003706          1054    1069*
T35     003714          1068    1075*
WAIT1   011356          2141*   2142
WAIT2   011534          2170*   2171    2175
WCLEN   001052           531*   1079*   1080*   1081    1100*   1101*   1102    1118*   1119*   1120    1138*   1139*   1140
                        1369*   1370*   1371    1396*   1397*   1398    1453*   1454*   1457    1472*   1473*   1476
```

```
[illegible]  011574  2135*  2153*  2155  2160*  2182*
[illegible]  011460  2163  2157*
XBA16  =  000020  1632*
XBA17  =  000040  1633*
XCHKBU  014572  523  2363*
XINBUF  013570  526  2067  2079  2361*
XMTST  011526  2163  2169*
YESRT  007206  1598  1608*
YESTR  007130  1584  1596*
YESTR1  007206  1585  1587  1596*  1606*
YESTR2  007204  1588  1597*  1607*
[illegible]  012324  2246  2304*
$CRLF  012332  2264  2305*
$CR11  012365  1575  2312*
$HD  =  000003  453  454
$HERE  012433  499  2320*
[illegible]  012402  501  2315*
[illegible]  012346  2262  2308*
[illegible]  012336  2248  2306*
[illegible]  012357  2273  2310*
[illegible]  012360  2255*
$SWR  =  160000  453  454*
[illegible]  =  000001  453*
.  =  014574  486*  487*  490*  493*  495*  504*  572  589  604  617  629  641  645
                658  662  675  679  688  692  701  705  714  718  727  739  743
                744  754  757  760  763  766  769  772  775  779  782  795  799
                791  795  798  801  815  821  831  835  844  848  859  872  880
                896  909  915  929  935  948  965  969  972  977  980  985  988
                998  1004  1008  1025  1028  1031  1057  1060  1064  1088  1090  1109  1127
                1129  1147  1163  1166  1169  1190  1193  1197  1200  1204  1216  1219  1223
                1226  1231  1244  1254  1263  1267  1278  1292  1295  1304  1317  1321  1327
                1345  1357  1383  1384  1386  1410  1411  1437  1464  1488  1489  1509  1515
                1518  1521  1527  1538  1552  1557  1562  1565  1574  1602  1693  1697  1701
                1778  2094  2101  2104  2112  2117  2125  2177  2357*  2359*  2361  2362*  2363
.EMPTY  012506  2337  2341*
.REST  012552  2344  2353*
.RE  012536  2342  2349*  2352
.RETR  012560  2351  2356*
.SAV  012564  2350*  2353  2359*
```

L04

```
MAINDEC-11-DZDRB-D      MACY11 27(732)  20-SEP-76  10:15  PAGE 53
DZDRB.P11       CROSS REFERENCE TABLE -- MACRO NAMES

COMMEN         1#
ENDCOM         1#
ESCAPE         1#
GETPRI         1#
GETSWR         1#
[illegible]    1#
NEWTST         1#
POP            1#
PUSH           1#
REPORT         1#
SETPRI         1#
SETUP          1#
SKIP           1#
[illegible]    1#
[illegible]    1#     440#     441     455     459     507     509     557     559     579     580     594     596     608     610
              620     622     633     635     650     652     667     669     692     694     695     697     708     710     721
              723     734     736     747     749     804     807     824     826     838     840     851     853     865     867
              879     881     899     901     919     921     939     940     959     961     991     993    1038    1040    1072
             1074    1093    1095    1112    1114    1131    1133    1150    1152    1174    1177    1235    1237    1247    1249
             1257    1259    1270    1272    1284    1287    1295    1300    1309    1311    1331    1334    1353    1355    1389
             1391    1414    1416    1448    1450    1467    1469    1569    1571    1577    1579    1593    1595    1612    1614
             1652    1654    1669    1670    1682    1684    1715    1717    1725    1728    1738    1740    1756    1759    1784
             1788    1813    1816    1826    1829    1841    1845    1851    1853    1886    1889    1904    1907    1923    1925
             1943    1946    1971    1974    1988    1991    2003    2006    2021    2025    2047    2050    2086    2099    2190
             2192    2204    2206    2229    2232    2296    2298    2329    2331
SWRSU          1#
TYPBIN         1#
TYPDEC         1#
TYPNAM         1#
TYPNUM         1#
TYPOS          1#
TYPOCT         1#
TYPTXT         1#
$$ESCA         1#
$$NEWT         1#
$$SKIP         1#
.EQUAT         1#
.HEADE         1#     440#     443
.KT11          1#
.SETUP         1#
.SWRHI         1#
.$ACT1         1#
.$APTB         1#
.$APTH         1#
.$APTY         1#
.$ASTA         1#
.$CATC         1#
.$CMTA         1#
.$CB20         1#
.$DB20         1#
.$DIV          1#
.$EOF          1#
.$ERRO         1#
.$ERRT         1#
.$MULT         1#
.$POWE         1#
```



```
ADC     1984  2063
ADD      854  1326  1360  1442  1507  1510  1524  1525  1529  1796  1968  1982  2062  2153
        2154  2159  2165
ASL     1795  2276  2277  2279
BMBRB   1708  1939  1436
BMD      445   888   904   617   629   645   662   679   692   705   719   731   744   779   792
         485   891   895   791   798   801   815   821   831   835   944   949   953   972   986
         920   980   988   998  1001  1004  1009  1035  1028  1031  1057  1060  1064  1090  1103
        1191  1244  1254  1263  1267  1278  1295  1304  1380  1396  1407  1437  1441  1481  1493
        1498  1522  1538  1552  1584  1596  1693  1697  1701  1705  1752  1756  1973  1875
        1901  1956  1960  2041  2094  2152  2163  2174  2216  2282  2335  2342  2344
        2001  2272
BMDMB   2001
BMP      643   660   677   690   703   716   729   742   777   820   895   914   934  1002  1196
        1221  1349  1434  1513  1560  1589  1834  1890  1895  1919  1939  1963  2151  2243  2259
        2238
BMPB    2133  2273
BMS      639   656   673   686   699   712   725   738   751   810   813   893   912   932   951
         967   975   983  1430  1603  1879  1981  1952  1920  1940  1956
BMSB    2280
BMT      640   644   657   661   674   678   687   691   700   704   713   717   726   730   739
         743   753   756   759   762   765   768   771   774   778   791   794   797   790   794
         797   800   885   889   904   908   924   928   943   947   964   968   971   975   979
         984   997   997  1000  1003  1168  1196  1222  1291  1234  1303  1379  1406  1484  1593
        1765  1855  1872  1874  1893  1900  1937  1957  1964  2093  2196  2210  2213
BLE     2036
BLT     1898  1969  1979  2044  2053
BMI     1190  1193  1200  1216  1219  1226  1317  1325  1327  1345  1357  1518  1565  1602  1774
        1914  1932  2144
BNE      551   641   658   675   688   701   714   727   740   754   757   760   763   756   769
         772   775   863   876   886   890   905   909   925   929   944   948   969   977   985
        1020  1052  1163  1166  1169  1292  1292  1354  1541  1555  1557  1768  1779  1956  1834
        1938  1965  2055  2057  2156  2167  2197  2211  2214  2239  2245  2260  2263  2267  2337
BPL      998  1204  1231  1321  1503  1515  1562  1574  1803  1910  1928  2101  2104  2112  2117
        2125  2142  2171  2177  2241  2297  2300  2346
BR       512   545   573   896   915   935  1022  1035  1037  1054  1068  1070  1089  1109  1127
        1147  1328  1383  1384  1410  1411  1443  1464  1488  1489  1520  1511  1665  1713  1876
        1902  1980  1993  2016  2146  2168  2175  2218  2261  2268  2275  2293  2348  2352  2354
CLR      497   498   569   955   856   857   869   870   954   963   974   983   990  1206  1010
        1016  1018  1036  1044  1048  1050  1069  1086  1107  1125  1145  1159  1184  1252  1312
        1274  1276  1323  1340  1348  1352  1376  1403  1420  1428  1446  1462  1491  1494  1496
        1543  1543  1644  1644  1599  1600  1656  1683  1680  1680  1681  1681  1681  1681  1681
        1747  1749  1751  1752  1753  1754  1797  1805  1805  1974  1955  1976  1999  2000  2000
        2003  2134  2136  2160  2161  2213  2254  2255  2282  2293  2294  2339  2339
CMP      543  5446   616   627   830   834   843   847   858   871   955  1027  1039  1034  1041
        1059  1089  1128  1171  1198  1214  1253  1263  1266  1277  1285  1441  1441  1441  1441
        1508  1537  1540  1554  1556  1692  1698  1700  1739  1900  1937  1959  1987  1987  1987
        1988  2020  2054  2155  2200  2215  2238  2244  2266
CMPB    1436  1601  1602  1603  1604  1605  1606  1607  1608  1609  1610  1611  1612  1613  1614
        1615  1616  1617  1618  1619  1620  1621  1622  1623  1624  1625  1626  1627  1628  1629
        1630  1631  1632  1633  1634  1635  1636  1637  1638  1639  1640
```

COS

```
MAINDEC-11-CZORB-C      MACY11 27(732)  20-SEP-76  10:15  PAGE 59
CZORB.P11        CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

          [illegible]  [illegible]  1975  1989  1992  2004  2007  2022  2026  2049  2051  2087  2090  2131  2133
          [illegible]  [illegible]  [illegible]  2232  2287  2289  2330  2332
.ENDC     [illegible]  2324  [illegible]  459  [illegible]  509  557  559  578  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  652  667  669  682  684  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  807  824  826  833  840  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  919  921  939  940  959  961  991  993  1038  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  1133  1150  1152  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  1298  1300  1309  1311  1321  [illegible]  1363  [illegible]  1379  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  1469  1569  1571  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  1715  [illegible]  1726  [illegible]  1738  1740  1756  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  1945  1951  1953  1886  1888  [illegible]  1907  1923  1926  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  2025  2047  2050  2086  2089  2130  2132
.IFF      [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  579  581  595  597  609  611  621  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  668  [illegible]  [illegible]  685  686  698  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  954  [illegible]  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  920  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  1339  [illegible]  1103  [illegible]  [illegible]  1236  1239  1149  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  1468  [illegible]  [illegible]  [illegible]  [illegible]  1339  1336  1364  1366  [illegible]  [illegible]  [illegible]
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  1589  1594  1596  1613  [illegible]  [illegible]  [illegible]
          1669  1671  1683  1695  1716  1718  1727  1729  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]
          1810  1827  1830  1942  1846  1852  1954  1897  [illegible]  1909  1909  [illegible]  [illegible]  1933  [illegible]
          1972  1975  1989  1992  2004  2007  2022  2026  2049  2051  2087  2090  2131  2133
          2232  2232  2233  2287  2289  2330  2332
.IIF      447   448   453   454
.LIST     441   442   443   459   460   461   487
.MACRO
.MCALL    443
.NLIST    441   442   443   459   460   461   487
.REM
.REPT     441   459   487
.TITLE    443
.WORD     2233  2234  2235  2236


ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

*,CZORB.SEQ/SOL/CRF/PAGNUM=LIB:SYSMAC.SML,DSK:CZORB
RUN-TIME: 30 37 4 SECONDS
RUN-TIME RATIO: 171/71=2.3
CORE USED:  33K  (65 PAGES)
```

DOS

Spooler runtime 9 Seconds, 41 KCS, 246 disk reads, 3 disk writes, 54 pages