RF11

STATIC TESTS

MD-11-DZRFA-B

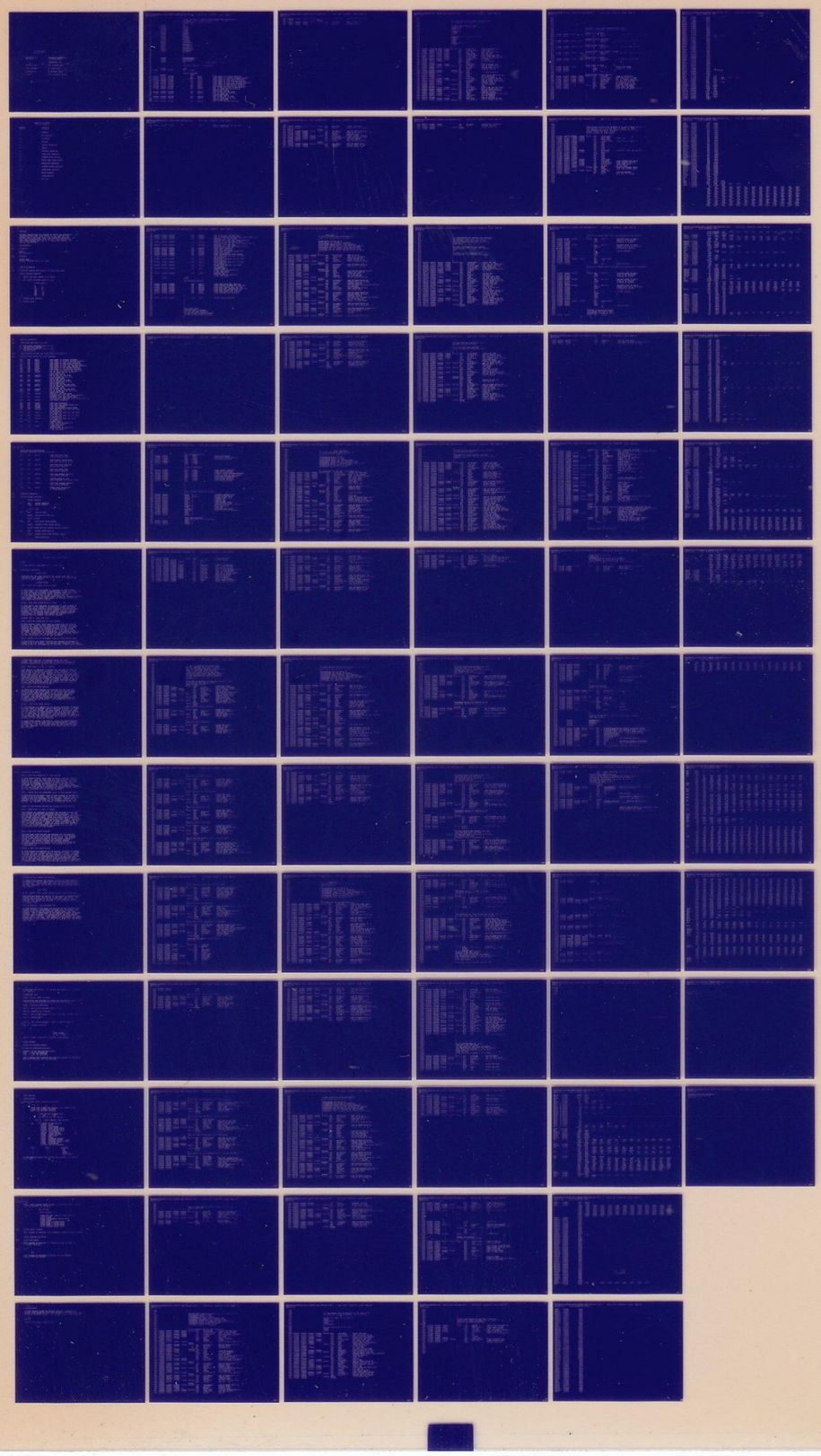
EP-DZRFA-B-DL

JUN 1978

digital

FICHE 1 OF 1

MADE IN USA



IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZRFA-B-D
REPLACES:	MAINDEC-11-D50A
	SUPERSEDES D50A
PRODUCT NAME:	RF11 STATIC TESTS
DATE CREATED:	31 MARCH 1973
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	EARL HAIGHT/C CASWELL

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1. ABSTRACT

THE RF11 STATIC TEST IS A SERIES OF STATIC AND ADDRESS AND DATA RELIABILITY ROUTINES WHICH VERIFY TO THE USER THE DISK CONTROL (RF11) AND DISK (RS11) ARE OPERATING CORRECTLY. THIS TEST USED IN CONJUNCTION WITH THE RF11 DISK DATA AND RF11 MULTI DISK ASSURES THE USER OF AN ERROR FREE SYSTEM, WHEN USED IN ITS ENTIRETY.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11
RF11 AND RS11

2.2 STORAGE

STATIC TEST
PROGRAM OCCUPIES FROM 0 TO 11546

3. LOADING PROCEDURE

3.1 METHOD OF LOADING BOTH STATIC AND DATA TEST TAPES

PROGRAM FORMAT ABSOLUTE

A. VERIFY THE BOOT LOADER IS IN MEMORY.

B. SET SWITCH REGISTER EQUAL TO .500

MEMORY SIZE .	
4K	17
8K	37
12K	57
16K	77
20K	117
24K	137
28K	157

C. DEPRESS LOAD ADDRESS.

D. DEPRESS START.

4. STARTING PROCEDURE

4.1 WORST CASE DISK TEST UNIT ZERO

A) SET SWITCH REGISTER EQUAL TO 200
B) DEPRESS LOAD ADDRESS
C) SET SWITCH REGISTER EQUAL TO ZERO
D) DEPRESS START

4.2 UNDER MONITOR CONTROL THE TESTS START AUTOMATICALLY

4.3 ADDRESS ENTRY POINTS FOR TEST ROUTINES

```
300     JMP     STAI1           TEST RESET TO CONTROL REGISTER
304     JMP     STAI2           TEST RESET TO CURRENT ADDRESS REGISTER
310     JMP     STAI3           TEST RESET TO WORD COUNT REGISTER
314     JMP     STAI4           TEST RESET TO DISK ADDRESS REGISTER
320     JMP     STAI5           TEST RESET TO DISK EXT. ADDRESS REGISTER
324     JMP     STAI6           TEST RESET TO DAT BUFFER REGISTER
330     JMP     STAI7           TEST RESET TO MAINTENANCE REGISTER
334     JMP     STAI10          CAN WE SET W/R BITS IN DCS REGISTER
340     JMP     STAI11          CAN WE CLEAR THE DCS REGISTER
                                USING DISK CLEAR.
344     JMP     STAI12          CAN WE SET ALL CMA BITS
350     JMP     STAI13          CAN WE CLEAR ALL CMA BITS
                                USING DISK CLEAR
354     JMP     STAI14          CAN WE SET ALL WC BITS
360     JMP     STAI15          CAN WE CLEAR ALL WC BITS
                                USING DISK CLEAR
364     JMP     STAI16          CAN WE SET ALL THE DAR BITS
370     JMP     STAI17          CAN WE CLEAR ALL THE DAR BITS
                                USING DISK CLEAR
374     JMP     STAI20          CAN WE SET ALL THE DAE BITS
400     JMP     STAI21          CAN WE CLEAR ALL THE DAE BITS.
                                USING DISK CLEAR
404     JMP     STAI22          EXECUTE A ONE WORD WRITE
                                FOLLOWED BY A ONE WORD WRITE CONTINUE
410     JMP     STAI40          EXECUTE A ONE WORD WRITE CHECK
                                FOLLOWED BY A ONE WORD WRITE CHECK CONTINUE
420     JMP     STAI74          TEST TRACK INCREMENT

424     JMP     STAI77          TEST DISK INCREMENT
430     JMP     STA103          TEST THAT NED RAISES ERROR FLAG
434     JMP     ST105X          CHECK CMA INHIBIT
440     JMP     NXMTSM          TEST NON-EXISTENT MEMORY ERROR
444     JMP     STA106          TEST THAT THE DISK WILL NOT TRAP
                                AT PRIORITY 7
450     JMP     STA110          TEST THAT THE DISK WILL NOT TRAP
                                AT PRIORITY 6
454     JMP     STA112          TEST THAT THE DISK WILL NOT TRAP
                                AT PRIORITY 5
460     JMP     STA114          TEST THAT THE DISK WILL TRAP
                                AT PRIORITY 4
464     JMP     ADT1            ADDRESS TEST 1
                                CHECK TIMING BY EXECUTING
                                A ONE WORD WRITE
470     JMP     ADT2X           ADDRESS TEST 2
                                CHECK TIMING BY EXECUTING
                                A ONE WORD READ
```

(4,3 CONT'D)

```
        ***MAINTENANCE ROUTINES***
        ROUTINES IN STATIC AND DATA TEST BOTH

        650     JMP     SELWC           LOAD WORD COUNT REG.
                                        WITH SWITCH REGISTER

        654     JMP     SELCMA          LOAD CURRENT MEMORY ADDR
                                        REG. WITH SWITCH REGISTER

        660     JMP     SELDAR          LOAD DISK ADDR. REGISTER
                                        WITH SWITCH REGISTER

        664     JMP     SELDAE          LOAD DISK ADDR. EXT.
                                        WITH SWITCH REGISTER

        670     JMP     SELDBR          LOAD DATA BUFFER REGISTER
                                        WITH SWITCH REGISTER

        674     JMP     MOVLK           MOVE CONTENTS OF LOOK
                                        AHEAD REGISTER INTO DATA LIGHTS

        700     JMP     SELDCS          LOAD DISK CONTROL REGISTER
                                        WITH SWITCH REGISTER

        704     JMP     STAMP           ENABLE READ AMPLIFIERS
                                        TO TRACK SELECTED
```

5. OPERATING PROCEDURE

5.1 CONTROL SWITCH SETTINGS

```
        DELETE TYPEOUT

SR14    SET     DELETE TYPEOUTS
        RESET   REPORT MESSAGE

        LOOP ON TEST

SR11    SET     LOOP ON TEST

        RESET   CONTINUE TO NEXT TEST

        HALT ON ERROR

SR10    SET     HALT AFTER ERROR REPORT

        RESET   CONTINUE AFTER ERROR REPORT

        SELECT TRACK FROM SR (DURING DYNAMIC TESTING)

SR7     SET     SELECT TRACK FROM SR

        RESET   SELECT TRACK UNDER PROGRAM CONROL

                TRACK SELECTION
```

6 5 4 3 2 1 0

SELECT ONE OF 177(8) TRACKS

NOTE:

* SWITCH SETTING APPLICABLE ONLY IN DATA TEST

5.2 SUBROUTINE ABSTRACTS

STATIC TEST

ABSTRACTS FOR THE LOGIC TESTS IN THE STATIC TEST ARE NOT INCLUDED IN THIS WRITE-UP, EACH SMALL TEST HAS A DESCRIPTION WITH IT IN THE ASSEMBLY.

ADDRESS TESTS

ADT1 - TEST WORD ACCESS DURING A WRITE

IN THIS TEST A ONE WORD WRITE IS ATTEMPTED ON EACH ADDRESS OF TRACK ZERO, IF NO ACCESS IS ACCOMPLISHED WITHIN 100 MILLI-SECONDS THE ERROR CONDITION MISSED TRANSFER (MXF) SHOULD SET, IF THIS FLAG SHOULD FAIL TO SET, A PROGRAM TIME OUT WILL BE REPORTED. IF NO CONTROL ERROR OCCURS AND ADDRESS CONFIRMED TAKES PLACE, THE ROUTINE THEN CHECKS THE ADDRESS POINTER FOR THE CORRECT TERMINATING ADDRESS.

ADT2X - TEST WORD ACCESS DURING A READ

IN THIS TEST A ONE WORD READ IS ATTEMPTED ON EACH ADDRESS OF TRACK ZERO. IF NO ACCESS IS ACCOMPLISHED WITHIN 100 MILLI-SECONDS THE ERROR CONDITION MISSED TRANSFER (MXF) SHOULD SET, IF THIS FLAG SHOULD FAIL TO SET A PROGRAM TIME OUT WILL BE REPORTED. IF NO CONTROL ERROR OCCURS AND ADDRESS CONFIRMED TAKES PLACE, THE ROUTINE THEN CHECKS THE ADDRESS POINTER REGISTER FOR THE CORRECT TERMINATING ADDRESS.

ADDRESS TEST IN DATA TEST ONLY

ADT2 - TEST FOR ALTERATION OF WORD ADDRESS

IN THIS ADDRESS TEST, TRACK ZERO IS LOADED WITH ALL ONES IN BLOCK OF 2K. THEN THE TEST STARTING WITH ADDRESS 0 AND PRO-GRESSING UP THROUGH AND INCLUDING ADDRESS 3777(8), THE OCTAL VALUE OF THE ADDRESS, IS WRITTEN ON ITSELF AND ALL OTHER ADDRESSES ARE CHECKED FOR MODIFICATION. THEY SHOULD EQUAL ALL ONES. AFTER CHECK IS COMPLETED AND ALL ERRORS ARE REPORTED IF ANY, THE ROUTINE THEN RE-WRITES THE ADDRESS WITH ALL ONES AND THEN CONTINUES ON WITH THE NEXT ADDRESS.

ADT3 : VERIFY THAT ALL ADDRESSES EXIST ON DISK SURFACE TRACK

IN THIS ROUTINE THE OCTAL VALUE OF EACH ADDRESS IS WRITTEN ON ITSELF IN 2K WORD BLOCKS. THE ROUTINE THEN READS THE DISK AND VERIFIES THAT ALL ADDRESSES CAN BE ACCESSED, ERRORS MAY BE REPORTED

IN THIS TEST WHICH ARE NOT ADDRESS ERRORS BUT DATA
ERRORS, THE OPERATOR IS CAUTIONED TO CAREFULLY EXAMINE THE
ERRORS TO DISTINGUISH BETWEEN THE ADDRESS AND DATA ERRORS.

ADT4 - TEST BRACK "X" AND "Y" MATRIX

THIS ROUTINE WAS DESIGNED TO ENABLE THE OPERATOR AN EASY AND
SURE METHOD OF DETECTING DEFECTIVE MATRIX SWITCHES, IN THIS
ROUTINE THE FIRST AND LAST LOCATION OF EACH TRACK (0 AND 3777(8))
ARE WRITTEN WITH ALL ONES, AFTER THE INITIAL WRITE HAS TAKEN
PLACE, THE ROUTINE THEN STARTS WITH THE FIRST WORD OF THE ABOVE
INDICATED LOCATION AND WRITES THE ADDRESS ON ITSELF, THE NEXT
STEP OF THE ROUTINE IS TO CHECK ALL OTHER ADDRESSES TO SEE IF
THEY HAVE BEEN ALTERED, AFTER ALL ERRORS HAVE BEEN REPORTED,
IF ANY, THE ROUTINE RE-WRITES THE ADDRESS WITH ALL ONES AND
CONTINUES ON WITH THE NEXT ADDRESS.

ADT5 - TEST LOOK AHEAD FEATURE

THE DISK LOOK AHEAD FEATURE WAS DESIGNED FOR THE USER WHO
WANTED OPTIMUM USE OF THE DISK, BY KNOWING AT WHAT ADDRESS
THE DISK READ HEADS ARE LOCATED AT ALL TIMES, THE ADDRESS
LOADED INTO THE ADS REGISTER IS THE PHYSICAL ADDRESS OF
THE DISK, THE PROGRAM LOCATES THE PHYSICAL ADDRESS
BY WRITE A WORD AND UPON RECEIVING THE COMPLETION FLAG THE
PROGRAM READS THE ADS REGISTER, THE ADDRESS MAY BE UP TO
2 ADDRESSES OFF.

SPIRAL - TEST DISK TRACK SPIRAL

IN THIS ROUTINE THE ABILITY OF THE CONTROL (RF09/15) TO SPIRAL
FROM ONE TRACK TO ANOTHER DURING A READ AND A WRITE, IN ORDER
TO CHECK THE READ SPIRAL, THE LAST ADDRESS (3777(8)) OF TRACK
ZERO IS WRITTEN WITH PRE-DETERMINED DATA AND THE FIRST ADDRESS
(0) OF TRACK ONE, IS ALSO WRITTEN WITH PRE-DETERMINED DATA.
THEN A TWO WORD READ STARTING AT LOCATION 3777(8) OF TRACK ZERO
IS ACCOMPLISHED, THE TWO WORDS THEN ARE COMPARED TO THE DATA
WRITTEN AND ANY ERRORS ARE REPORTED.

TO CHECK WRITE SPIRAL, THE ROUTINE WRITES TWO WORDS STARTING
AT ADDRESS 3777(8) OF TRACK ZERO AND TERMINATES AT LOCATION 0
OF TRACK ONE, THE ROUTINE THEN READS THE TWO LOCATIONS WITH
ONE WORD TRANSFERS, AND VERIFIES THE CORRECT DATA WAS STORED IN
EACH LOCATION.

5.3 SUBROUTINE ABSTRACTS

ADT2 - TEST FOR ALTERATION OF WORD ADDRESS

IN THIS ADDRESS TEST, TRACK ZERO IS LOADED WITH ALL ONES IN BLOCK OF 2K. THEN THE TEST STARTING WITH ADDRESS 0 AND PROGRESSING UP THROUGH AND INCLUDING ADDRESS 3777(8), THE OCTAL VALUE OF THE ADDRESS, IS WRITTEN ON ITSELF AND ALL OTHER ADDRESSES ARE CHECKED FOR MODIFICATION. THEY SHOULD EQUAL ALL ONES. AFTER CHECK IS COMPLETED AND ALL ERRORS ARE REPORTED IF ANY, THE ROUTINE THEN RE-WRITES THE ADDRESS WITH ALL ONES AND THEN CONTINUES ON WITH THE NEXT ADDRESS.

ADT3 - VERIFY THAT ALL ADDRESSES EXIST ON DISK SURFACE TRACK

IN THIS ROUTINE THE OCTAL VALUE OF EACH ADDRESS IS WRITTEN ON ITSELF IN 2K WORD BLOCKS. THE ROUTINE THEN READS THE DISK AND VERIFIES THAT ALL ADDRESSES CAN BE ACCESSED. ERRORS MAY BE REPORTED IN THIS TEST WHICH ARE NOT ADDRESS ERRORS BUT DATA ERRORS. THE OPERATOR IS CAUTIONED TO CAREFULLY EXAMINE THE

ERRORS TO DISTINGUISH BETWEEN THE ADDRESS AND DATA ERRORS.

ADT4 - TEST TRACK "X" AND "Y" MATRIX

THIS ROUTINE WAS DESIGNED TO ENABLE THE OPERATOR AN EASY AND SURE METHOD OF DETECTING DEFECTIVE MATRIX SWITCHES. IN THIS ROUTINE THE FIRST AND LAST LOCATION OF EACH TRACK (0 AND 3777(8)) ARE WRITTEN WITH ALL ONES. AFTER THE INITIAL WRITE HAS TAKEN PLACE, THE ROUTINE THEN STARTS WITH THE FIRST WORD OF THE ABOVE INDICATED LOCATION AND WRITES THE ADDRESS ON ITSELF. THE NEXT STEP OF THE ROUTINE IS TO CHECK ALL OTHER ADDRESSES TO SEE IF THEY HAVE BEEN ALTERED. AFTER ALL ERRORS HAVE BEEN REPORTED, IF ANY, THE ROUTINE RE-WRITES THE ADDRESS WITH ALL ONES AND CONTINUES ON WITH THE NEXT ADDRESS.

ADT5 - TEST LOOK AHEAD FEATURE

THE DISK LOOK AHEAD FEATURE WAS DESIGNED FOR THE USER WHO WANTED OPTIMUM USE OF THE DISK, BY KNOWING AT WHAT ADDRESS THE DISK READ HEADS ARE LOCATED AT ALL TIMES. THE ADDRESS LOADED INTO THE ADS REGISTER IS THE PHYSICAL ADDRESS OF THE DISK. THE PROGRAM LOCATES THE PHYSICAL ADDRESS BY WRITE A WORD AND UPON RECEIVING THE COMPLETION FLAG THE PROGRAM READS THE ADS REGISTER. THE ADDRESS MAY BE UP TO 2 ADDRESSES OFF.

SPIRAL - TEST DISK TRACK SPIRAL

IN THIS ROUTINE THE ABILITY OF THE CONTROL (RF09/15) TO SPIRAL FROM ONE TRACK TO ANOTHER DURING A READ AND A WRITE. IN ORDER TO CHECK THE READ SPIRAL, THE LAST ADDRESS (3777(8)) OF TRACK ZERO IS WRITTEN WITH PRE-DETERMINED DATA AND THE FIRST ADDRESS (0) OF TRACK ONE, IS ALSO WRITTEN WITH PRE-DETERMINED DATA. THEN A TWO WORD READ STARTING AT LOCATION 3777(8) OF TRACK ZERO IS ACCOMPLISHED. THE TWO WORDS THEN ARE COMPARED TO THE DATA

WRITTEN AND ANY ERRORS ARE REPORTED.

TO CHECK WRITE SPIRAL, THE ROUTINE WRITES TWO WORDS STARTING AT ADDRESS 3777(8) OF TRACK ZERO AND TERMINATES AT LOCATION 0 OF TRACK ONE. THE ROUTINE THEN READS THE TWO LOCATIONS WITH ONE WORD TRANSFERS, AND VERIFIES THE CORRECT DATA WAS STORED IN EACH LOCATION.

DATA TESTS

RANEX - RANDOM DATA, RANDOM ADDRESS RANDOM WORD COUNT TEST

THIS ROUTINES TESTS THE ABILITY OF THE SYSTEM TO ACCESS RANDOM ADDRESS WITH RANDOM DATA AND AN INCREMENTAL WORD COUNT. THE DATA IS FIRST WRITTEN ON THE DISK AND THEN DATA IS WRITE-CHECKED. ALL ERRORS ARE REPORTED. THE WORD COUNT RUNS FROM 1 TO 1000(8) WORDS.

DATA RELIABILITY - DATA PATTERN TEST

IN THIS PORTION OF THE TEST, THE ABILITY OF THE COMPLETE DISK SURFACE TO WRITE, WRITE-CHECK, AND READ DATA IS TESTED. THE ROUTINE FIRST WRITES THE COMPLETE SURFACE WITH A SET DATA PATTERN, THEN A WRITE CHECK OF THE COMPLETE SURFACE IS ACCOMPLISHED, THUS REPORTING ALL ERRORS BETWEEN THE DATA WRITTEN AND THE DATA IN MEMORY. THREE READS ARE ACCOMPLISHED FOR EACH BUFFER AREA ON THE DISK. THE OPERATOR AT THIS POINT HAS SEVERAL OPTIONS AS TO WHAT COURSE OF ACTION THE PROGRAM WILL TAKE NEXT. (REF. SEC. 5.1)

IN THE DATA RELIABILITY, ALL PROGRAM PARAMETERS CAN BE CHANGED.
REF. SEC. 5.2

MAINTENANCE TOOL

STAMP - STATIC TRACK SELECTION

THIS ROUTINE WAS DESIGNED TO ENABLE THE OPERATOR TO HAVE A QUICK METHOD OF SELECTING TRACKS FOR AMPLITUDE ADJUSTMENTS.

STAMP - OPERATING PROCEDURE

STEP A. SET SWITCH REGISTER EQUAL TO 704

STEP B. DEPRESS LOAD ADDRESS

STEP C. SET SWITCH REGISTER 9 THRU 7 EQUAL TO DISK #0 THRU 7

STEP D. DEPRESS START

STEP E. SET SWITCH REGISTER 6 THRU 0 EQUAL TO TRACK #

STEP F. DEPRESS CONTINUE

6	5	4	3	2	1	0
			TRACK NUMBER (0 THRU 177(8))			

STEP G. TRACK NUMBER CAN BE CHANGED ARBITRARILY.

6. ERROR REPORTS

6.1 STATIC AND ADDRESS REPORT.

XX ERR CNT XXXXXXWRD1XXXXWRD2

ERRCNT = IS THE TAG FOR THE LISTING
WRD1 = WHAT WAS EXPECTED
WRD2 = WHAT WAS RECEIVED

WHEN A REPORT ONLY CONTAINS ONE WORD THE PROGRAM WAS EXPECTING ZEROS BUT RECEIVED WHAT WAS REPORTED.

6.2 ERROR REPORTS

STATUS ERROR

STATUS ERROR XXDAE XXXXXXDAR XXXXXXDCS

A B C

A=THE DISK NUMBER AND EXTENDED DISK ADDRESS BITS.
B=THE DISK ADDRESS REGISTER
C=THE DISK CONTROL REGISTER

LAYOUT OF DISK ADDRESS BITS

DAE DAR

XXX XXX XXX XXX XXX XXX XXX

DISK NO. TRACK ADDRESS WORD ADDRESS

BIT LAYOUT OF DCS REGISTER

BIT15= ERROR
BIT14= DISK FREEZE
BIT13= WRITE CHECK ERROR
BIT12= DATA PARITY ERROR
BIT11= NON-EXISTENT DISK
BIT10= WRITE LOCKOUT
BIT9= MISSED TRANSFER
BIT8= DISK CLEAR
BIT7= READY
BIT6= INTERRUPT ENABLE
BIT5= EXTENDED MEMORY 1 (XM1)
BIT4= EXTENDED MEMORY 0 (XM0)
BIT3= MAINTENANCE
BIT2-1= FUNCTION REGISTER

BIT 2	BIT 1	OPERATION
0	0	NOP
1	0	READ
0	1	WRITE
1	1	WRITE CHECK

IF THE ERROR OCCURRED WHEN READING THE PROGRAM WILL REPORT WHICH READ.

(6.2 CONT'D)

NOTE: WHEN A FREEZE ERROR OCCURS AN ADDITIONAL ERROR MESSAGE WILL BE REPORTED, AS FOLLOWS:

XXX HRD ERR

LAYOUT OF BITS 0 - 7

BIT0= CMA INH, (NOT AN ERROR CONDITION)
BIT1= UNUSED
BIT2= NON-EXISTENT MEMORY ERROR
BIT3= UNUSED
BIT4= TRACK C TIMING ERROR
BIT5= TRACK B TIMING ERROR
BIT6= TRACK A TIMING ERROR
BIT7= ADDRESS PARITY ERROR

6.3 MEMORY PARITY ERRORS

THIS MESSAGE IS REPORTED IF THE PROGRAM DETECTS A PARITY ERROR

DURING PROGRAM EXECUTION.

6.4 POWER HAS FAILED

THIS MESSAGE IS REPORTED TO INDICATE A POWER FAILURE AND A PROGRAM RESTARTS.

6.5 END

END

THIS MESSAGE IS REPORTED AT THE END OF ONE COMPLETE PASS OF THE DISK SYSTEM.

7. MISCELLANEOUS

IN SOME ADDRESS TESTS THE PROGRAM DEPENS ON WRITTING AND
PEADING DATA CORRECTLY FROM THE DISK,AND IF IT DOES NOT IT MAY
REPORT AN ADDRESS FAILURE, WHEN IN FACT IT WAS A DATA FAILURE.

8. RUNTIME

TYPEOUT WILL OCCUR WITHIN 5 MIN.

```
                                .TITLE  MAINDEC-11-DZRFA-B RF-11 STATIC TEST REPLACES D50A
                                ;COPYRIGHT 1973, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
                                ;PROGRAM BY E. HAIGHT/C.CASSWELL
                                .ENABL  ABS
000000                          N=0
000001                          BIT0=1
000002                          BIT1=2
000004                          BIT2=4
000010                          BIT3=10
000020                          BIT4=20
000040                          BIT5=40
000100                          BIT6=100
000200                          BIT7=200
000400                          BIT8=400
001000                          BIT9=1000
002000                          BIT10=2000
004000                          BIT11=4000
010000                          BIT12=10000
020000                          BIT13=20000
040000                          BIT14=40000
100000                          BIT15=100000
000004                          SCOPE=IOT
                                ;
                                ;
                                ;
104403                          WRITE=TRAP+3
104407                          WRCHECK=TRAP+7
104405                          READ=TRAP+5
000000                          .=0                     ;TRAP CATCHER 0 => 776

                                ;MACRO FOR SETTING UP ERROR COUNT

000200                          .=200
000200  000167  000672          JMP     START

                                ;STATIC ROUTINES
000300                                  .=300
000300  000167  000716                  JMP     STAI1           ;TEST RESET TO CONTROL REGISTER
000304  000167  000774                  JMP     STAI2           ;TEST RESET TO CURRENT ADDRESS REGISTER
000310  000167  001020                  JMP     STAI3           ;TEST RESET TO WORD COUNT REGISTER
000314  000167  001044                  JMP     STAI4           ;TEST RESET TO DISK ADDRESS REGISTER
000320  000167  001070                  JMP     STAI5           ;TEST RESET TO DISK EXT. ADDRESS REGISTER
000324  000167  001114                  JMP     STAI6           ;TEST RESET TO DATE BUFFER REGISTER
000330  000167  001140                  JMP     STAI7           ;TEST RESET TO MAINTENANCE REGISTER
000334  000167  001164                  JMP     STAI10          ;CAN WE SET W/R BITS IN DCS REGISTER
000340  000167  001230                  JMP     STAI11          ;CAN WE CLEAR THE DCS REGISTER
                                                                ;USING DISK CLEAR.
000344  000167  001274                  JMP     STAI12          ;CAN WE SET ALL CMA BITS
000350  000167  001340                  JMP     STAI13          ;CAN WE CLEAR ALL CMA BITS
                                                                ;USING DISK CLEAR
000354  000167  001472                  JMP     STAI14          ;CAN WE SET ALL WC BITS
000360  000167  001536                  JMP     STAI15          ;CAN WE CLEAR ALL WC BITS
                                                                ;USING DISK CLEAR
000364  000167  001574                  JMP     STAI16          ;CAN WE SET ALL THE DAR BITS
```

```
    55  000370  000167  001640                    JMP     STAI17          ;CAN WE CLEAR ALL THE DAR BITS
    56                                                                    ;USING DISK CLEAR
```

```
                                                JMP     STAI20          ;CAN WE SET ALL THE DAE BITS
                                                JMP     STAI21          ;CAN WE CLEAR ALL THE DAE BITS, USING DISK CLEAR
                                                JMP     STAI22          ;EXECUTE A ONE WORD WRITE
                                                                        ;FOLLOWED BY A ONE WORD WRITE CONTINUE
                                                JMP     STAI40          ;EXECUTE A ONE WORD WRITE CHECK
                                                                        ;FOLLOWED BY A ONE WORD WRITE CHECK CONTINUE
                                                JMP     STAI56          ;EXECUTE A ONE WORD READ
                                                                        ;FOLLOWED BY A ONE WORD READ CONTINUE
                                                JMP     STAI74          ;TEST TRACK INCREMENT
                                                JMP     STAI77          ;TEST DISK INCREMENT
                                                JMP     STA103          ;TEST THAT NED RAISES ERROR FLAG
                                                JMP     ST105X          ;CHECK CMA INHIBIT
                                                JMP     NXMTSM          ;TEST NON-EXISTENT MEMORY ERROR
                                                JMP     STA106          ;TEST THAT THE DISK WILL NOT TRAP
                                                                        ;AT PRIORITY 7
                                                JMP     STA110          ;TEST THAT THE DISK WILL NOT TRAP
                                                                        ;AT PRIORITY 6
                                                JMP     STA112          ;TEST THAT THE DISK WILL NOT TRAP
                                                                        ;AT PRIORITY 5
                                                JMP     STA114          ;TEAST THAT THE DISK WILL TRAP
                                                                        ;AT PRIORITY 4
                                                JMP     ADT1            ;ADDRESS TEST 1
                                                                        ;CHECK TIMING BY EXECUTING
                                                                        ;A ONE WORD WRITE
                                                JMP     ADT2X           ;ADDRESS TEST 2
                                                                        ;CHECK TIMING BY EXECUTING
                                                                        ;A ONE WORD READ
        000650                          .=650
                                        ;
                                        ;MAINTENANCE ROUTINES
                                        ;
                                                JMP     SELWC           ;LOAD WORD COUNT REG WITH SWR
                                                JMP     SELCMA          ;LOAD CURRENT ADDRESS REG WITH SWR
                                                JMP     SELDAR          ;LOAD DISK ADDRESS REG WITH SWR
                                                JMP     SELDAE          ;LOAD DISK EXT. ADDRESS REG WITH SWR
                                                JMP     SELDBP          ;LOAD DATA BUFFER REG WITH SWR
                                                JMP     MOVLK           ;MOVE LOOK AHEAD INTO LIGHTS
                                                JMP     SELDCS          ;LOAD FUNCTION REG WITH SWR
                                        ;
                                        ;
                                                JMP     STAMP           ;SELECT TRACKS STATICLY
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;RF11 DATA TEST
                                        ;VECTORS USED IN PROGRAM
                                        ;#1 LOC 204 DISK INTERRUPT
                                        ;#2 LOC 30 EMT (TELETYPE OUTPUT)
                                        ;#3 LOC 34 TRAP (DISK HANDLERS)
                                        ;
```

```
111
112          001000                  .=1000
```

```
                                        .EVEN
                                ;
                                ;I/O ADDRESS POINTERS
001000  177570                  SWR:    177570          ;SWITCH REGIISTER
001002  177776                  PS:     177776          ;PROCESSOR STATUS REGISTER
001004  177566                  TPB:    177566          ;TELETYPE REGISTERS
001006  177562                  TKB:    177562
001010  177564                  TPS:    177564
001012  177560                  TKS:    177560
                                ;
                                ;DISK I/O REGISTERS
                                ;
001014  177460                  DCS:    177460          ;DISK CONTROL REGISTER
001016  177462                  WC:     177462          ;WORD COUNT REGISTER
001020  177464                  CMA:    177464          ;CURRENT MEMORY ADDRESS REGISTER
001022  177466                  DAR:    177466          ;LOWER 16 BITS OF DISK ADDRESS
001024  177470                  DAE:    177470          ;EXTENSION ADDRESS REGISTER
001026  177472                  DBR:    177472          ;DATA BUFFER REGISTER
001030  177474                  MA:     177474          ;MAINTENANCE REGISTER
001032  177476                  ADS:    177476          ;LOOK AHEAD REGISTER
                                ;
                                ;
                                ;
                                ;
                                ;
                                ;RF11 DEDICATE REGISTERS (MEMORY)
                                ;
001034  000000                  FLAG:   0               ;INTERNAL PROGRAM FLAG
001036  146723                  RANNU:  146723          ;RANDOM NUMBER PRIME
001040  000000                  WRDCT:  0               ;WORKING WORD COUNT
001042  000000                  TRACK:  0               ;WORKING DAE
001044  000000                  DMA:    0               ;WORKING DAR
001046  000000                  PATNU:  0               ;DATA PATTERN INDEX
001050  000000                  BUF:    0               ;WORKING DATA BUFFER (OLT-IN)
001052  000000                  TWRDCT: 0               ;TEMP WORD COUNT
001054  000000                  TDMA:   0               ;TEMP DAR
001056  000000                  SWRDCT: 0               ;STANDARD WORD COUNT
001060  000000                  ERCOUNT:0               ;ERROR COUNT FOR MESSAGES.
001062  000000                  SAVE:   0
001064  000000                  SAV1:   0
001066  000000                  PASS:   0
                                ;
                                ;RF11 WORK REGISTERS
                                ;(CAN BE CHANGED IN ANY ROUTINE)
001070  000000                  WORK:   0
001072  000000                  WORK1:  0
001074  000000                  WORK2:  0
```

```
     001076  000005                    START:  RESET                      ;CLEAR THE WORLD
     001100  012706  001000                    MOV     #1000,%6           ;SET UP STACK
     001104  012767  000006  176672            MOV     #6,4
     001112  005067  176670                    CLR     6
     001116  012767  000340  177062            MOV     #340,206           ;LOCK UP INTERRUPTS
     001124  012767  010662  176676            MOV     #EMTRP,30          ;SET UP TTY POINTER
     001132  012767  000340  176672            MOV     #340,32            ;LOCK UP INTERRUPTS
     001140  012767  010130  176666            MOV     #DISK,34           ;SET UP DISK HANDLER POINTER
     001146  012767  000340  176662            MOV     #340,36            ;LOCK UP INTERRUPTS
     001154  012777  000340  177620            MOV     #340,@PS           ;LOCK UP INTERRUPT LEVELS
     001162  012767  010060  176630            MOV     #LOOP,20           ;SET UP FOR SCOPE LOOP
     001170  012767  000340  176624            MOV     #340,22            ;LOCK UP PRIORITY
     001176  012767  011214  176620            MOV     #DOWN,24           ;SET UP PWRFAIL
     001204  012767  000340  176614            MOV     #340,26            ;LOCK UP PRIORITYS
     001212  005067  177624                    CLR     TRACK              ;CLEAR TRACK REGISTERS
     001216  005067  177622                    CLR     DMA                ;CLEAR DAR REGISTERS
```

F2

```
                                ;WE ARE NOW ENTERING THE STATIC TEST
                                ;IF THE OPERATOR WOULD LIKE TO CHECK
                                ;THE DISK REGISTERS PRIOR TO ENTERING THIS
                                ;TEST WE HAVE SOME HANDY ROUTINES
                                ;WHICH WOULD ALLOW YOU TO LOAD THESE
                                ;REGISTERS UNDER SWITCH REGISTER CONTROL
                                ;PLEASE REFERENCE THE STARTING ADDRESS
                                ;TO SEE WHICH ROUTINE BEST SUITS YOUR
                                ;PROBLEM.
                                ;
                                ;THIS TEST IS DESIGNED TO TEST THE ABILITY OF RESET
                                ;TO CLEAR ALL THE DISK REGISTERS
                                ;TEST CONTROL REGISTER
001222  000005                  STAI1:  RESET                   ;CLEAR THE WORLD
001224  004767  010042                  JSR     %7,MAME         ;SET PARITY SWITCHES
001230  017767  177560  177632          MOV     @DCS,WORK       ;FETCH CONTROL REGISTER
001236  032767  177577  177624          BIT     #177577,WORK    ;IS IT CLEARED
001244  001405                          BEQ     XSTAI1          ;REGISTER OK (TEST READY)
001246  012767  000000  177604  ERR0:   MOV     #0,ERCOUNT      ;SET UP ERROR COUNT 0
001254  004567  007242                  JSR     %5,STAER        ;REPORT STATIC ERROR
001260  105767  177604          XSTAI1: TSTB    WORK            ;TEST FOR READY
001264  001005                          BNE     LPST1           ;BRANCH IF READY
001266  012767  000001  177564  ERR1:   MOV     #1,ERCOUNT      ;SET UP ERROR COUNT 1
001274  004567  007222                  JSR     %5,STAER        ;REPORT READY NOT SET
001300  000004                  LPST1:  SCOPE                   ;ENTER SCOPE LOOP
001302  001222                          STAI1
                                ;TEST CURRENT ADDRESS REGISTER
                                ;
001304  000005                  STAI2:  RESET                   ;CLEAR THE WORLD
001306  017767  177506  177554          MOV     @CMA,WORK       ;FETCH CMA REGISTER
001314  001405                          BEQ     LPST2           ;REGISTER OK
001316  012767  000002  177534  ERR2:   MOV     #2,ERCOUNT      ;SET UP ERROR COUNT 2
001324  004567  007172                  JSR     %5,STAER        ;REPORT ERROR
001330  000004                  LPST2:  SCOPE                   ;ENTER SCOPE LOOP
001332  001304                          STAI2
                                ;
                                ;TEST WORD COUNT REGISTER
                                ;
001334  000005                  STAI3:  RESET                   ;CLEAR THE WORLD
001336  017767  177454  177524          MOV     @WC,WORK        ;FETCH WC REG,
001344  001405                          BEQ     LPST3           ;REGISTER OK
001346  012767  000003  177504  ERR3:   MOV     #3,ERCOUNT      ;SET UP ERROR COUNT 3
001354  004567  007142                  JSR     %5,STAER        ;REPORT ERROR
001360  000004                  LPST3:  SCOPE                   ;ENTER SCOPE LOOP
001362  001334                          STAI3
```

```
                                        ;
                                        ;TEST DISK ADDRESS REGISTER
                                        ;
001364  000005                  STAI4:  RESET                   ;CLEAR THE WORLD
001366  017767  177430  177474          MOV     @DAR,WORK       ;FETCH DAR REGISTER
001374  001405                          BEQ     LPST4           ;REGISTER CLEARED
001376  012767  000004  177454  ERR4:   MOV     #4,ERCOUNT      ;SET UP ERROR COUNT 4
001404  004567  007112                  JSR     %5,STAER        ;REPORT ERROR
001410  000004                  LPST4:  SCOPE                   ;ENTER SCOPE LOOP
001412  001364                          STAI4
                                        ;
                                        ;TEST DISK EXT. ADDRESS REGISTER
                                        ;
001414  000005                  STAI5:  RESET                   ;CLEAR THE WORLD
001416  017767  177402  177444          MOV     @DAE,WORK       ;FETCH DAE REGISTERS
001424  001405                          BEQ     LPST5           ;DAE CLEARED
001426  012767  000005  177424  ERR5:   MOV     #5,ERCOUNT      ;SET UP ERROR COUNT 5
001434  004567  007062                  JSR     %5,STAER        ;REPORT ERROR
001440  000004                  LPST5:  SCOPE                   ;ENTER SCOPE LOOP
001442  001414                          STAI5
                                        ;
                                        ;TEST DATA BUFFER REGISTER
                                        ;
001444  000005                  STAI6:  RESET                   ;CLEAR THE WORLD
001446  017767  177354  177414          MOV     @DBR,WORK       ;FETCH DBR REGISTER
001454  001405                          BEQ     LPST6           ;DBR CLEARED
001456  012767  000006  177374  ERR6:   MOV     #6,ERCOUNT      ;SET UP ERROR COUNT 6
001464  004567  007032                  JSR     %5,STAER        ;REPORT ERROR
001470  000004                  LPST6:  SCOPE                   ;ENTER SCOPE LOOP
001472  001444                          STAI6
                                        ;
                                        ;TEST MAINTENANCE REGISTER
                                        ;
001474  000005                  STAI7:  RESET                   ;CLEAR THE WORLD
001476  017767  177326  177364          MOV     @MA,WORK        ;FETCH MAINTENANCE REG
001504  001405                          BEQ     LPST7           ;MA CLEARED
001506  012767  000007  177344  ERR7:   MOV     #7,ERCOUNT      ;SET UP ERROR COUNT 7
001514  004567  007002                  JSR     %5,STAER        ;REPORT ERROR
001520  000004                  LPST7:  SCOPE                   ;ENTER SCOPE LOOP
001522  001474                          STAI7
                                        ;
                                        ;CAN WE SET THE FUNCTION BITS IN THE DCS REG.
                                        ;BITS 7,6,5,4,3,2&1
                                        ;
001524  012777  000176  177262  STAI10: MOV     #176,@DCS       ;SET DISK FUNCTION BITS
001532  017767  177256  177330          MOV     @DCS,WORK       ;FETCH FUNCTION BITS
001540  022767  000376  177322          CMP     #376,WORK       ;ARE THE FUNCTION BITS SET
001546  001410                          BEQ     LPST10          ;FUNCTION BITS SET
001550  012767  000376  177314          MOV     #376,WORK1      ;SET UP FOR ERROR REPORT
001556  012767  000010  177274  ERR10:  MOV     #10,ERCOUNT     ;SET UP ERROR COUNT 10
001564  004567  007004                  JSR     %5,STAER1       ;REPORT ERROR (ERROR IN FUNCTION BITS)
001570  000004                  LPST10: SCOPE                   ;ENTER SCOPE LOOP
001572  001524                          STAI10
```

```
                                        ;
                                        ;WILL DISK CLEAR CLEAR THE FUNCTION BITS
                                        ;
001574  012777  000176  177212  STAI11: MOV     #176,@DCS       ;SET DISK FUNCTION BITS
001602  052777  000400  177204          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
001610  017767  177200  177252          MOV     @DCS,WORK       ;FETCH CONTROL REG
001616  022767  000200  177244          CMP     #200,WORK       ;IS ONLY READY SET
001624  001405                          BEQ     LPST11          ;REGISTER CLEARED
001626  012767  000011  177224  ERR11:  MOV     #11,ERCOUNT     ;SET UP ERROR COUNT 11
001634  004567  006662                  JSR     %5,STAER        ;REPORT ERROR
001640  000004                  LPST11: SCOPE                   ;ENTER SCOPE LOOP
001642  001574                          STAI11
                                        ;
                                        ;CAN WE SET ALL THE CMA BITS
                                        ;
001644  012767  177777  177220  STAI12: MOV     #177777,WORK1   ;SET UP CURRENT ADDR, OF ALL ONES
001652  016777  177214  177140          MOV     WORK1,@CMA      ;LOAD CMA
001660  017767  177134  177202          MOV     @CMA,WORK       ;FETCH CMA
001666  026767  177200  177174          CMP     WORK1,WORK      ;COMPARE FOR ALL BITS SET
001674  001405                          BEQ     LPST12          ;ALL BITS SET?
001676  012767  000012  177154  ERR12:  MOV     #12,ERCOUNT     ;SET UP ERROR COUNT 12
001704  004567  006664                  JSR     %5,STAER1       ;REPORT ERROR
001710  000004                  LPST12: SCOPE                   ;ENTER SCOPE LOOP
001712  001644                          STAI12
                                        ;
                                        ;WILL DISK CLEAR - CLEAR THE CMA REGISTER
                                        ;
001714  012777  177777  177076  STAI13: MOV     #177777,@CMA    ;SET CMA EQUAL TO ALL ONES
001722  052777  000400  177064          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
001730  005777  177064                  TST     @CMA            ;TEST FOR BIT0 SET IN CMA (READ ONLY BIT)
001734  001410                          BEQ     LPST13          ;WAS THE REST OF CMA CLEARED?
001736  017767  177052  177124          MOV     @DCS,WORK       ;NO; FETCH CMA REG.
001744  012767  000013  177106  ERR13:  MOV     #13,ERCOUNT     ;SET UP ERROR COUNT 13
001752  004567  006544                  JSR     %5,STAER        ;REPORT ERROR
001756  000004                  LPST13: SCOPE                   ;ENTER SCOPE LOOP
001760  001714                          STAI13
                                        ;TEST CMA WITH RANDOM NUMBERS USEING
                                        ;CONTENTS OF CORE
                                        ;
                                        ;
001762  012706  001000          ERR500: MOV     #1000,%6
001766  012767  002040  176010          MOV     #STOP,4
001774  005000                          CLR     %0
001776  011077  177016          CATST1: MOV     (%0),@CMA
002002  027720  177012                  CMP     @CMA,(%0)+
002006  001773                          BEQ     CATST1
002010  014067  177056                  MOV     -(%0),WORK1
002014  017767  177000  177046          MOV     @CMA,WORK
002022  012767  000500  177030          MOV     #500,ERCOUNT
002030  004567  006540                  JSR     %5,STAER1
002034  000167  177722                  JMP     ERR500
                                        ;
002040  012767  000006  175736  STOP:   MOV     #6,4
```

```
   333  002046  000004                          SCOPE
   334  002050  001762                          ERR500
   335                                 ;
   336                                 ;CAN WE SET ALL BITS IN WC REGISTER
   337                                 ;
   338  002052  012767  177777  177012  STAI14: MOV     #177777,WORK1    ;SET UP MAX. WORD COUNT
   339  002060  016777  177006  176730          MOV     WORK1,@WC        ;LOAD WC REGISTER
   340  002066  026777  177000  176722          CMP     WORK1,@WC        ;ARE ALL BITS SET
   341  002074  001410                          BEQ     LPST14           ;YES! EXIT
   342  002076  017767  176714  176764          MOV     @WC,WORK         ;NO! FETCH WC REG.
   343  002104  012767  000014  176746  ERR14:  MOV     #14,ERCOUNT      ;SET UP ERROR COUNT 14
   344  002112  004567  006456                  JSR     %5,STAER1        ;REPORT ERROR
   345  002116  000004                  LPST14: SCOPE                    ;ENTER SCOPE LOOP
   346  002120  002052                          STAI14
```

```
                                        ;
                                        ;WILL DISK CLEAR-CLEAR THE WORD COUNT REGISTER
                                        ;
002122  012777  177777  176666  STAI15: MOV     #177777,@WC     ;SET WC REGISTER EQUAL TO ALL ONES
002130  052777  000400  176656          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
002136  017767  176654  176724          MOV     @WC,WORK        ;FETCH WORD COUNT REGISTER
002144  001405                          BEQ     LPST15          ;YES! EXIT
002146  012767  000015  176704  ERR15:  MOV     #15,ERCOUNT     ;SET UP ERROR COUNT 15
002154  004567  006342                  JSR     %5,STAER        ;REPORT ERROR
002160  000004                  LPST15: SCOPE                   ;ENTER SCOPE LOOP
002162  002122                          STAI15
                                        ;
                                        ;CAN WE SET ALL THE BITS IN THE DAR REGISTER.
                                        ;
002164  012767  177777  176700  STAI16: MOV     #177777,WORK1
002172  016777  176674  176622          MOV     WORK1,@DAR      ;SET DAR TO ALL ONES
002200  017767  176616  176662          MOV     @DAR,WORK       ;FETCH DAR REGISTER
002206  026767  176660  176654          CMP     WORK1,WORK      ;ARE ALL BITS SET
002214  001405                          BEQ     LPST16          ;YES! EXIT
002216  012767  000016  176634  ERR16:  MOV     #16,ERCOUNT     ;SET UP ERROR COUNT 16
002224  004567  006344                  JSR     %5,STAER1       ;NOT ALL BITS SET REPORT ERROR
002230  000004                  LPST16: SCOPE                   ;ENTER SCOPE LOOP
002232  002164                          STAI16
                                        ;
                                        ;CAN WE CLEAR THE DAR REG, WITH DISK CLEAR.
                                        ;
002234  012777  177777  176560  STAI17: MOV     #177777,@DAR    ;SET DAR TO ALL ONES
002242  052777  000400  176544          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
002250  005777  176546                  TST     @DAR            ;TEST FOR ZERO DAR
002254  001410                          BEQ     LPST17          ;YES EXIT
002256  017767  176540  176604          MOV     @DAR,WORK       ;NO BITS SET IN DAR
002264  012767  000017  176566  ERR17:  MOV     #17,ERCOUNT     ;SET UP ERROR COUNT 17
002272  004567  006224                  JSR     %5,STAER        ;REPORT ERROR
002276  000004                  LPST17: SCOPE                   ;ENTER SCOPE LOOP
002300  002234                          STAI17
                                        ;
                                        ;CAN WE SET THE EXT. ADDRESS BITS IN THE DAE REGISTER
                                        ;
002302  012767  000037  176562  STAI20: MOV     #37,WORK1       ;
002310  016777  176556  176506          MOV     WORK1,@DAE      ;SET EXT. ADDRESS BITS
002316  017767  176502  176544          MOV     @DAE,WORK       ;FETCH CONTENTS OF DAE REG.
002324  026767  176542  176536          CMP     WORK1,WORK      ;ARE ALL EXT. ADDRESS BITS SET
002332  001405                          BEQ     LPST20          ;YES! EXIT
002334  012767  000020  176516  ERR20:  MOV     #20,ERCOUNT     ;SET UP ERROR COUNT 20
002342  004567  006226                  JSR     %5,STAER1       ;REPORT ERROR
002346  000004                  LPST20: SCOPE                   ;ENTER SCOPE LOOP
002350  002302                          STAI20
```

K2

```
                                        ;
                                        ;CAN WE CLEAR THE EXT ADDRESS BITS IN THE DAE REG,
                                        ;USING DISK CLEAR
                                        ;
002352  012777  000037  176444  STAI21: MOV     #37,@DAE        ;SET EXT, ADDRESS BITS
002360  052777  000400  176426          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
002366  017767  176432  176474          MOV     @DAE,WORK       ;FETCH CONTENTS OF DAE REG
002374  001405                          BEQ     LPST21          ;YES! EXIT
002376  012767  000021  176454  ERR21:  MOV     #21,ERCOUNT     ;SET UP ERROR COUNT 21

002404  004567  006112                  JSR     R5,STAER        ;REPORT ERROR
002410  000004                  LPST21: SCOPE                   ;ENTER SCOPE LOOP
002412  002352                          STAI21
```

```
                                        ;
                                        ;DO ONE WORD WRITE FOLLOWED BY ONE WORD WRITE CONTINUE
                                        ;ERROR1=BUSY FAILED TO SET
                                        ;ERROR2=BUSY FAILED TO CLEAR
                                        ;ERROR3=CONTROL ERROR WHEN X-FERING DATA
                                        ;ERROR4=DAE INCREMENTED WHEN X-FERING DATA
                                        ;ERROR5=DAR FAILED TO INCREMENT WHEN X-FERING DATA
                                        ;ERROR6=WORD COUNT FAILED TO OVERFLOW
                                        ;ERROR7=CMA FAILED TO INCREMENT
                                        ;
                                        ;
002414  052777  000400  176372  STAI22: BIS     #BIT8,@DCS      ;CLEAR THE DISK WORLD
002422  012767  177777  007170          MOV     #177777,OUTBUF  ;DATA TO BE X-FERED
002430  012777  011620  176362          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
002436  012777  177777  176352          MOV     #-1,@WC         ;SET WORD COUNT TO -1
002444  052777  000003  176342          BIS     #3,@DCS         ;GO WRITE
002452  105777  176336                  TSTB    @DCS            ;TEST FOR RDY=0
002456  100011                          BPL     STAI23          ;RDY=0
002460  017767  176330  176402          MOV     @DCS,WORK       ;BUSY NOT SET; FETCH DCS
002466                          ERROR1:
002466  012767  000022  176364  ERR22:  MOV     #22,ERCOUNT     ;SET UP ERROR COUNT 22
002474  004567  006022                  JSR     %5,STAER        ;REPORT ERROR
002500  000745                          BR      STAI22          ;RESTART TEST
002502  005067  176362          STAI23: CLR     WORK
002506  005267  176356          INCWAI: INC     WORK            ;WAIT FOR BUSY=0
002512  105777  176276                  TSTB    @DCS            ;IS BUSY CLEARED
002516  100417                          BMI     STAI24          ;FLAG CLEARED
002520  005767  176344                  TST     WORK            ;HAVE WE WAITED LONG ENOUGH
002524  001370                          BNE     INCWAI          ;RDY FAILED TO SET
002526  017767  176262  176334          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
002534  052767  000002  176330          BIS     #2,WORK1        ;WANT DCS SHOULD CONTAIN
002542                          ERROR2:
002542  012767  000023  176310  ERR23:  MOV     #23,ERCOUNT     ;SET UP ERROR COUNT 23
002550  004567  006020                  JSR     %5,STAER1       ;REPORT ERROR
002554  000717                          BR      STAI22          ;RESTART TEST
002556  017767  176232  176304  STAI24: MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
002564  005767  176300                  TST     WORK            ;IS ERROR FLAG SET
002570  100012                          BPL     STAI25          ;NO; X-FER OK
002572  012767  000202  176272          MOV     #202,WORK1      ;WHAT DCS SHOULD CONTAIN
002600                          ERROR3:
002600  012767  000024  176252  ERR24:  MOV     #24,ERCOUNT     ;SET UP ERROR COUNT 24
002606  004567  005762                  JSR     %5,STAER1       ;REPORT ERROR
002612  000167  177576                  JMP     STAI22          ;RESTART TEST
002616  017767  176202  176244  STAI25: MOV     @DAE,WORK       ;IS EXT. ADDRESS CLEAR
002624  001407                          BEQ     STAI26          ;DAE OK
002626                          ERROR4:
002626  012767  000025  176224  ERR25:  MOV     #25,ERCOUNT     ;SET UP ERROR COUNT 25
002634  004567  005662                  JSR     %5,STAER        ;REPORT ERROR
002640  000167  177550                  JMP     STAI22          ;RESTART TEST
002644  017767  176152  176216  STAI26: MOV     @DAR,WORK       ;WAS DAR INCREMENTED BY 1
002652  022767  000001  176210          CMP     #BIT0,WORK      ;IS DAR CORRECT
002660  001412                          BEQ     STAI27          ;DAR OK
```

```
  463  002662  012767  000001  176202          MOV     #BIT0,@CSR1     ;WHAT BAR SHOULD CONTAI
  464  002670                          ERCR5:
  465  002670  012767  000026  176162  ERR24:  MOV     #26,ERCOUNT     ;SET UP ERROR COUNT 26
  466  002676  004567  005672                  JSR     R5,STAER1       ;REPORT ERROR
  467  002702  000167  177506                  JMP     STRT22          ;RESTART TEST
```

```
 468
 469  002706  017767  176104  176154  STAI27: MOV     #WC,WORK          ;FETCH WORD COUNT
 470  002714  001407                          BEQ     STAI30            ;WORD COUNT DID OVERFLOW
 471  002716                          ERROR6:
 472  002716  012767  000027  176134  ERR27:  MOV     #27,ERCOUNT       ;SET UP ERROR COUNT 27
 473  002724  004567  005572                  JSR     %5,STAER          ;WORD COUNT FAILED TO OVERFLOW
 474  002730  000167  177460                  JMP     STAI22            ;RESTART TEST
 475  002734  017767  176060  176126  STAI30: MOV     @CMA,WORK         ;FETCH CURRENT ADDRESS
 476  002742  012767  011622  176122          MOV     #OUTBUF+2,WORK1   ;WHAT CMA SHOULD EQUAL
 477  002750  026767  176116  176112          CMP     WORK1,WORK        ;IS CMA CORRECT
 478  002756  001407                          BEQ     STAI31            ;YES EXECUTE CONTINUE
 479  002760                          ERROR7:
 480  002760  012767  000030  176072  ERR30:  MOV     #30,ERCOUNT       ;SET UP ERROR COUNT 30
 481  002766  004567  005602                  JSR     %5,STAER1         ;REPORT ERROR IN CMA
 482  002772  000167  177416                  JMP     STAI22            ;ERROR RESTART TEST
```

```
                                        ;       TEST WRITE
                                        ;A WRITE CONTINUE WILL BE EXECUTED NOW
                                        ;WORD COUNT WILL BE SET TO -1 AGAIN
                                        ;
                                        ;ERROR10=BUSY NOT SET BY GO
                                        ;ERROR11=BUSY NOT CLEARED BY OVERFLOW
                                        ;ERROR12=DISK ERROR OCCURED WHILE X-FERING
                                        ;ERROR13=DAE INCREMENTED WHEN CONTINUE WAS EXECUTED
                                        ;ERROR14=DAR DID NOT EQUAL 2 AFTER SECOND X-FER
                                        ;ERROR15=WC DID NOT OVERFLOW AT THE END OF X-FER
                                        ;ERROR16=CMA DID NOT EQUAL OUTBUF+2 AT END OF X-FER
                                        ;
                                        ;
002776  012777  177777  176012 STAI31: MOV     #177777,@WC     ;SET WC TO -1
003004  052777  000001  176002         BIS     #BIT0,@DCS      ;SET GO TO CONTINUE
003012  105777  175776                 TSTB    @DCS            ;TEST FOR RDY SET
003016  100012                         BPL     STAI32          ;BUSY WAS SET BY GO
003020  017767  175770  176042         MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
003026                         ERROR10:
003026  012767  000031  176024 ERR31: MOV     #31,ERCOUNT     ;SET UP ERROR COUNT 31
003034  004567  005462                 JSR     %5,STAER        ;REPORT BUSY NOT SET
003040  000167  177350                 JMP     STAI22
003044  005067  176020         STAI32: CLR     WORK
003050  105777  175740         INCBUSY:TSTB    @DCS            ;TST FOR RDY SET BY OVERFLO
003054  100415                         BMI     STAI33          ;READY SET CONTINUE
003056  005267  176006                 INC     WORK            ;WAIT FOR RDY=1
003062  001372                         BNE     INCBUSY         ;GO WAIT FOR RDY
003064  017767  175724  175776         MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
003072                         ERROR11:
003072  012767  000032  175760 ERR32: MOV     #32,ERCOUNT     ;SET UP ERROR COUNT 32
003100  004567  005416                 JSR     %5,STAER        ;REPORT BUSY NOT CLEARED
003104  000167  177304                 JMP     STAI22          ;RESTART ROUTINE
003110  005777  175700         STAI33: TST     @DCS            ;DID AN ERROR OCCUR WHILE X-FERING
003114  100015                         BPL     STAI34          ;NO CONTINUE
003116  017767  175672  175744         MOV     @DCS,WORK       ;YES! CONTENTS OF DCS
003124  017767  175674  175740         MOV     @DAE,WORK1      ;EXT ERROR BITS
003132                         ERROR12:
003132  012767  000033  175720 ERR33: MOV     #33,ERCOUNT     ;SET UP ERROR COUNT 33
003140  004567  005430                 JSR     %5,STAER1       ;REPORT ERROR OCCURRED,
003144  000167  177244                 JMP     STAI22          ;RESTART ROUTINE
003150  005777  175650         STAI34: TST     @DAE            ;DID DAE INC, BY DATA WAS X-FERRED
003154  001412                         BEQ     STAI35          ;OK IT DID NOT INC
003156  017767  175642  175704         MOV     @DAE,WORK       ;ERROR IT INCREMENTED
003164                         ERROR13:
003164  012767  000034  175666 ERR34: MOV     #34,ERCOUNT     ;SET UP ERROR COUNT 34
003172  004567  005324                 JSR     %5,STAER        ;REPORT DAE INCREMENTED
003176  000167  177212                 JMP     STAI22
003202  017767  175614  175660 STAI35: MOV     @DAR,WORK       ;DID DAR INCREMENT ON CONTINUE
003210  012767  000002  175654         MOV     #2,WORK1        ;WHAT DAR SHOULD CONTAIN
003216  026767  175650  175644         CMP     WORK1,WORK      ;IS DAR CORRECT
003224  001407                         BEQ     STAI36          ;DAR OK
003226                         ERROR14:
003226  012767  000035  175624 ERR35: MOV     #35,ERCOUNT     ;SET UP ERROR COUNT 35
```

```
  537  003234  004567  005334                 JSR     %5,STAER1       ;REPORT DAR INCORRECT
  538  003240  000167  177150                 JMP     STAI22          ;RE-START ROUTINE
  539  003244  017767  175546  175616  STAI36: MOV     @#C,WORK        ;FETCH WORD COUNT
  540  003252  001407                         BEQ     STAI37          ;WORD COUNT OVERFLOWED
  541  003254                          EROR15:
  542  003254  012767  000036  175576  ERR36: MOV     #36,ERCOUNT     ;SET UP ERROR COUNT 36
  543  003262  004567  005234                 JSR     %5,STAER        ;REPORT WORD COUNT FAILED TO CLEAR
  544  003266  000167  177122                 JMP     STAI22          ;RESTART ROUTINE
  545  003272  017767  175522  175570  STAI37: MOV     @#CMA,WORK      ;FETCH CMA
  546  003300  012767  011624  175564         MOV     #OUTBUF+4,WORK1 ;WHAT CMA SHOULD EQUAL
  547  003306  026767  175560  175554         CMP     WORK1,WORK      ;IS CMA CORRECT
  548  003314  001407                         BEQ     LPST22          ;CMA WAS CORRECT
  549  003316                          EROR16:
  550  003316  012767  000037  175534  ERR37: MOV     #37,ERCOUNT     ;SET UP ERROR COUNT 37
  551  003324  004567  005244                 JSR     %5,STAER1       ;REPORT CMA INCORRECT
  552  003330  000167  177060                 JMP     STAI22          ;RESTART ROUTINE
  553  003334  000004                 LPST22: SCOPE                   ;ENTER SCOPE LOOP
  554  003336  002414                         STAI22
```

```
                                        ;              TEST WRITE CHECK
                                        ;DO A ONE WORD WRITE CHECK FOLLOWED BY
                                        ;A ONE WORD WRITE CHECK CONTINUE
                                        ;
                                        ;EROR17=BUSY FAILED TO SET
                                        ;EROR20=BUSY FAILED TO CLEAR
                                        ;EROR21=DISK ERROR WHEN X-FERING DATA
                                        ;EROR22=DAE INCREMENTED WHEN X-FERING DATA
                                        ;EROR23=DAR FAILED TO INCREMENT WHEN X-FERING DATA
                                        ;EROR24=WORD COUNT FAILED TO OVERFLOW
                                        ;EROR25=CMA FAILED TO INCREMENT
                                        ;
                                        ;
003340  052777  000400  175446  STAI40: BIS     #BIT8,@DCS      ;CLEAR THE DISK WORLD
003346  012767  177777  006244          MOV     #177777,OUTBUF  ;DATA TO BE X-FERED
003354  012777  011620  175436          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
003362  012777  177777  175426          MOV     #-1,@WC         ;SET WORD COUNT TO -1
003370  052777  000007  175416          BIS     #7,@DCS         ;GO WRITE CHECK
003376  105777  175412                  TSTB    @DCS            ;TEST FOR READY
003402  100011                          BPL     STAI41          ;NOT READY
003404  017767  175404  175456          MOV     @DCS,WORK       ;SET! FETCH DCS
003412                          EROR17:
003412  012767  000040  175440  ERR40:  MOV     #40,ERCOUNT     ;SET UP ERROR COUNT 40
003420  004567  005076                  JSR     %5,STAER        ;REPORT ERROR
003424  000745                          BR      STAI40          ;RESTART TEST
003426  005067  175436          STAI41: CLR     WORK
003432  005267  175432          WCWAT:  INC     WORK            ;WAIT FOR READY
003436  105777  175352                  TSTB    @DCS
003442  100417                          BMI     STAI42          ;FLAG SET
003444  005767  175420                  TST     WORK            ;HAVE WE WAITED LONG ENOUGH
003450  001370                          BNE     WCWAT           ;READY FAILED TO SET
003452  017767  175336  175410          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
003460  052767  000006  175404          BIS     #6,WORK1        ;WANT DCS SHOULD CONTAIN
003466                          EROR20:
003466  012767  000041  175364  ERR41:  MOV     #41,ERCOUNT     ;SET UP ERROR COUNT 41
003474  004567  005074                  JSR     %5,STAER1       ;REPORT ERROR
003500  000717                          BR      STAI40          ;RESTART TEST
003502  017767  175306  175360  STAI42: MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
003510  100021                          BPL     STAI43          ;NO! X-FER OK
003512  026727  175352  120006          CMP     WORK,#120006    ;DID WCE OCCUR
003520  001006                          BNE     EROR21          ;
003522  012767  120000  175342          MOV     #120000,WORK1   ;YES WCE OCCURRED
003530  052767  000006  175334          BIS     #6,WORK1        ;WHAT DCS SHOULD CONTAIN
003536                          EROR21:
003536  012767  000042  175314  ERR42:  MOV     #42,ERCOUNT     ;SET UP ERROR COUNT 42
003544  004567  005024                  JSR     %5,STAER1       ;REPORT ERROR
003550  000167  177564                  JMP     STAI40          ;RESTART TEST
003554  017767  175244  175306  STAI43: MOV     @DAE,WORK       ;IS EXT, ADDRESS CLEAR
003562  001407                          BEQ     STAI44          ;DAE OK
003564                          EROR22:
003564  012767  000043  175266  ERR43:  MOV     #43,ERCOUNT     ;SET UP ERROR COUNT 43
003572  004567  004724                  JSR     %5,STAER        ;REPORT ERROR
```

```
609  003576  000167  177536                      JMP     STAI40          ;RESTART TEST
610  003602  017767  175214  175260  STAI44:     MOV     @DAR,@WORK      ;WAS DAR INCREMENTED BY 1
611  003610  022767  000001  175252              CMP     #BIT0,@WORK     ;IS DAR CORRECT
612  003616  001412                              BEQ     STAI45          ;DAR OK
613  003620  012767  000001  175244              MOV     #BIT0,WORK1     ;@HAT DAR SHOULD CONTAI!
614  003626                          ERROR23:
615  003626  012767  000044  175224  ERR44:     MOV     #44,ERCOUNT     ;SET UP ERROR COUNT 44
616  003634  004567  004734                      JSR     %5,STAER1       ;REPORT ERROR
617  003640  000167  177474                      JMP     STAI40          ;RESTART TEST
618  003644  017767  175146  175216  STAI45:     MOV     @WC,@WORK       ;FETCH @ORD COUNT
619  003652  001407                              BEQ     STAI46          ;@ORD COUNT DID OVERFLO@
620  003654                          ERROR24:
621  003654  012767  000045  175176  ERR45:     MOV     #45,ERCOUNT     ;SET UP ERROR COUNT 45
622  003662  004567  004634                      JSR     %5,STAER        ;@ORD COUNT FAILED TO OVERFLO@
623  003666  000167  177446                      JMP     STAI40          ;RESTART TEST
624  003672  017767  175122  175170  STAI46:     MOV     @CMA,@WORK      ;FETCH CURRENT ADDRESS
625  003700  012767  011622  175164              MOV     #OUTBUF+2,WORK1 ;@HAT CMA SHOULD EQUAL
626  003706  026767  175160  175154              CMP     @WORK1,@WORK    ;IS CMA CORRECT
627  003714  001407                              BEQ     STAI47          ;YES EXECUTE CONTINUE
628  003716                          ERROR25:
629  003716  012767  000046  175134  ERR46:     MOV     #46,ERCOUNT     ;SET UP ERROR COUNT 46
630  003724  004567  004644                      JSR     %5,STAER1       ;REPORT ERROR IN CMA
631  003730  000167  177404                      JMP     STAI40          ;ERROR RESTART TEST
```

```
                                        ;
                                        ;A WRITE CHECK CONTINUE CONTINUE WILL BE EXECUTED NOW
                                        ;WORD COUNT WILL BE SET TO -1 AGAIN
                                        ;
                                        ;ERROR26=BUSY WAS NOT SET BY GO
                                        ;ERROR27=BUSY NOT CLEARED BY OVERFLOW
                                        ;ERROR30=DISK ERROR OCCURRED WHILE X-FERING
                                        ;ERROR31=DAE INCREMENTED WHEN CONTINUE WAS EXECUTED
                                        ;ERROR32=DAR DID NOT EQUAL 2 AFTER SECOND X-FER
                                        ;ERROR33=WC DID NOT=0 AFTER X-FER
                                        ;ERROR34=CMA DID NOT=OUTBUF+2 AT END OF X-FER
                                        ;
                                        ;
003734  012777  177777  175054  STAI47: MOV     #177777,@WC     ;SET WC TO -1
003742  052777  000001  175044          BIS     #RITO,@DCS      ;SET GO TO CONTINUE
003750  105777  175040                  TSTB    @DCS            ;TEST FOR READY
003754  100012                          BPL     STAI50          ;
003756  017767  175032  175104          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
003764                          ERROR26:
003764  012767  000047  175066  ERR47:  MOV     #47,ERCOUNT     ;SET UP ERROR COUNT 47
003772  004567  004524                  JSR     %5,STAER        ;REPORT BUSY NOT SET
003776  000167  177336                  JMP     STAI40
004002  005067  175062          STAI50: CLR     WORK
004006  105777  175002          WCBUSI: TSTB    @DCS            ;TST FOR RDY SET BY OVERFLOW
004012  100415                          BMI     STAI51          ;BRANCH IF READY SET
004014  005267  175050                  INC     WORK            ;WAIT FOR BUSY=0
004020  001372                          BNE     WCBUSI          ;GO WAIT FOR RDY
004022  017767  174766  175040          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
004030                          ERROR27:
004030  012767  000050  175022  ERR50:  MOV     #50,ERCOUNT     ;SET UP ERROR COUNT 50
004036  004567  004460                  JSR     %5,STAER        ;REPORT RDY NOT SET
004042  000167  177272                  JMP     STAI40          ;RESTART ROUTINE
004046  005777  174742          STAI51: TST     @DCS            ;DID AN ERROR OCCUR WHILE X-FERING
004052  100024                          BPL     STAI52          ;NO CONTINUE
004054  017767  174734  175006          MOV     @DCS,WORK       ;YES; CONTENTS OF DCS
004062  026727  175002  120006          CMP     WORK,#120006
004070  001006                          BNE     ERR51
004072  012767  120000  174772          MOV     #120000,WORK1
004100  052767  000006  174764          BIS     #6,WORK1        ;EXT ERROR BITS
004106                          ERROR30:
004106  012767  000051  174744  ERR51:  MOV     #51,ERCOUNT     ;SET UP ERROR COUNT 51
004114  004567  004454                  JSR     %5,STAER1       ;REPORT ERROR OCCURRED
004120  000167  177214                  JMP     STAI40          ;RESTART ROUTINE
004124  005777  174674          STAI52: TST     @DAE            ;DID DAE INC, BY DATA WAS X-FERED
004130  001412                          BEQ     STAI53          ;OK IT DID NOT INC
004132  017767  174666  174730          MOV     @DAE,WORK       ;ERROR IT INCREMENTED
004140                          ERROR31:
004140  012767  000052  174712  ERR52:  MOV     #52,ERCOUNT     ;SET UP ERROR COUNT 52
004146  004567  004350                  JSR     %5,STAER        ;REPORT DAE INCREMENTED
004152  000167  177162                  JMP     STAI40
004156  017767  174640  174704  STAI53: MOV     @DAR,WORK       ;DID DAR INCREMENT ON CONTINUE
004164  012767  000002  174700          MOV     #2,WORK1        ;WHAT DAR SHOULD CONTAIN
004172  026767  174674  174670          CMP     WORK1,WORK      ;IS DAR CORRECT
```

```
   686  004200  001407                          BEQ     STAI54          ;DAR OK
   687  004202                          ERROR32:
   688  004202  012767  000053  174650  ERR53:  MOV     #53,ERCOUNT     ;SET UP ERROR COUNT 53
   689  004210  004567  004360                  JSR     %5,STAER1       ;REPORT DAR INCORRECT
   690  004214  000167  177120                  JMP     STAI40          ;RF-START ROUTINE
   691  004220  017767  174572  174642  STAI54: MOV     @#C,WORK        ;FETCH WORD COUNT
   692  004226  001407                          BEQ     STAI55          ;WORD COUNT OVERFLOWED
   693  004230                          ERROR33:
   694  004230  012767  000054  174622  ERR54:  MOV     #54,ERCOUNT     ;SET UP ERROR COUNT 54
   695  004236  004567  004260                  JSR     %5,STAER        ;REPORT WORD COUNT FAILED TO CLEAR
   696  004242  000167  177072                  JMP     STAI40          ;RESTART ROUTINE
   697  004246  017767  174546  174614  STAI55: MOV     @CMA,WORK       ;FETCH CMA
   698  004254  012767  011624  174610          MOV     #OUTBUF+4,WORK1 ;WHAT CMA CHOULD EQUAL
   699  004262  026767  174604  174600          CMP     WORK1,WORK      ;IS CMA CORRECT
   700  004270  001407                          BEQ     LPST40          ;CMA WAS CORRECT
   701  004272                          ERROR34:
   702  004272  012767  000055  174560  ERR55:  MOV     #55,ERCOUNT     ;SET UP ERROR COUNT 55
   703  004300  004567  004270                  JSR     %5,STAER1       ;REPORT CMA INCORRECT
   704  004304  000167  177030                  JMP     STAI40          ;RESTART ROUTINE
   705  004310  000004                  LPST40: SCOPE                   ;ENTER SCOPE LOOP
   706  004312  003340                          STAI40
```

```
                                        ;       TEST READ
                                        ;ONE WORD READ FOLLOWED BY A ONE WORD
                                        ;READ CONTINUE.
                                        ;
                                        ;ERROR35=BUSY WAS NOT SET BY GO
                                        ;ERROR36=BUSY NOT CLEARED BY OVERFLOW
                                        ;ERROR37=DISK ERROR OCCURRED WHILE X-FERING DATA
                                        ;ERROR40=DAE INCREMENTED WHEN X-FERING DATA
                                        ;ERROR41=DAR FAILED TO INCREMENT WHEN X-FERING DATA
                                        ;ERROR42=WORD COUNT FAILED TO OVERFLOW
                                        ;ERROR43=CMA FAILED TO INCREMENT
                                        ;
                                        ;
004314  052777  000400  174472  STAI56: BIS     #BIT8,@DCS      ;CLEAR THE DISK WORLD
004322  012767  177777  005270          MOV     #177777,OUTBUF  ;DATA TO BE X-FERED
004330  012777  011620  174462          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
004336  012777  177777  174452          MOV     #-1,@WC         ;SET WORD COUNT TO -1
004344  052777  000005  174442          BIS     #5,@DCS         ;GO READ
004352  105777  174436                  TSTB    @DCS            ;TEST FOR BUSY=1
004356  100011                          BPL     STAI57          ;BUSY SET
004360  017767  174430  174502          MOV     @DCS,WORK       ;BUSY NOT SET; FETCH DCS
004366                          ERROR35:
004366  012767  000056  174464  ERR56:  MOV     #56,ERCOUNT     ;SET UP ERROR COUNT 56
004374  004567  004122                  JSR     %5,STAER        ;REPORT ERROR
004400  000745                          BR      STAI56          ;RESTART TEST
004402  005067  174462          STAI57: CLR     WORK
004406  005267  174456          RDWAT:  INC     WORK            ;WAIT FOR BUSY=0
004412  105777  174376                  TSTB    @DCS            ;IS BUSY CLEARED
004416  100417                          BMI     STAI60          ;FLAG CLEARED
004420  005767  174444                  TST     WORK            ;HAVE WE WAITED LONG ENOUGH
004424  001370                          BNE     RDWAT           ;BUSY FAILED TO CLEAR
004426  017767  174362  174434          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
004434  052767  000005  174430          BIS     #5,WORK1        ;WANT DCS SHOULD CONTAIN
004442                          ERROR36:
004442  012767  000057  174410  ERR57:  MOV     #57,ERCOUNT     ;SET UP ERROR COUNT 57
004450  004567  004120                  JSR     %5,STAER1       ;REPORT ERROR
004454  000717                          BR      STAI56          ;RESTART TEST
004456  017767  174332  174404  STAI60: MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
004464  005767  174400                  TST     WORK            ;IS ERROR FLAG SET
004470  100012                          BPL     STAI61          ;NO; X-FER OK
004472  012767  000003  174372          MOV     #3,WORK1        ;WHAT DCS SHOULD CONTAIN
004500                          ERROR37:
004500  012767  000060  174352  ERR60:  MOV     #60,ERCOUNT     ;SET UP ERROR COUNT 60
004506  004567  004062                  JSR     %5,STAER1       ;REPORT ERROR
004512  000167  177576                  JMP     STAI56          ;RESTART TEST
004516  017767  174302  174344  STAI61: MOV     @DAE,WORK       ;IS EXT. ADDRESS CLEAR
004524  005767  174340                  TST     WORK            ;DAE SHOULD NOT HAVE INC.
004530  001407                          BEQ     STAI62          ;DAE OK
004532                          ERROR40:
004532  012767  000061  174320  ERR61:  MOV     #61,ERCOUNT     ;SET UP ERROR COUNT 61
004540  004567  003756                  JSR     %5,STAER        ;REPORT ERROR
004544  000167  177544                  JMP     STAI56          ;RESTART TEST
```

```
   761  004550  017767  174246  174312  STAI62: MOV     @DAR,WORK       ;WAS DAR INCREMENTED BY 1
   762  004556  022767  000001  174304          CMP     #BIT0,WORK      ;IS DAR CORRECT
   763  004564  001412                          BEQ     STAI63          ;DAR OK
   764  004566  012767  000001  174276          MOV     #BIT0,WORK1     ;WHAT DAR SHOULD CONTAIN
   765  004574                          EROR41:
   766  004574  012767  000062  174256  ERR62:  MOV     #62,ERCOUNT     ;SET UP ERROR COUNT 62
   767  004602  004567  003766                  JSR     %5,STAER1       ;REPORT ERROR
   768  004606  000167  177502                  JMP     STAI56          ;RESTART TEST
   769  004612  017767  174200  174250  STAI63: MOV     @WC,WORK        ;FETCH WORD COUNT
   770  004620  001407                          BEQ     STAI64          ;WORD COUNT DID OVERFLOW
   771  004622                          EROR42:
   772  004622  012767  000063  174230  ERR63:  MOV     #63,ERCOUNT     ;SET UP ERROR COUNT 63
   773  004630  004567  003666                  JSR     %5,STAER        ;WORD COUNT FAILED TO OVERFLOW
   774  004634  000167  177454                  JMP     STAI56          ;RESTART TEST
   775  004640  017767  174154  174222  STAI64: MOV     @CMA,WORK       ;FETCH CURRENT ADDRESS
   776  004646  012767  011622  174216          MOV     #OUTBUF+2,WORK1 ;WHAT CMA SHOULD EQUAL
   777  004654  026767  174212  174206          CMP     WORK1,WORK      ;IS CMA CORRECT
   778  004662  001407                          BEQ     STAI65          ;YES EXECUTE CONTINUE
   779  004664                          EROR43:
   780  004664  012767  000064  174166  ERR64:  MOV     #64,ERCOUNT     ;SET UP ERROR COUNT 64
   781  004672  004567  003676                  JSR     %5,STAER1       ;REPORT ERROR IN CMA
   782  004676  000167  177412                  JMP     STAI56          ;ERROR RESTART TEST
```

```
                                        ;A READ CONTINUE WILL BE EXECUTED NOW
                                        ;WORD COUNT WILL BE SET TO -1 AGAIN
                                        ;
                                        ;ERROR44=BUSY NOT SET BY GO
                                        ;ERROR45=BUSY NOT CLEARED BY OVERFLOW
                                        ;ERROR46=DISK ERROR OCCURRED WHILE X-FERING
                                        ;ERROR47=DAE INCREMENTED WHEN CONTINUE WAS EXECUTED
                                        ;ERROR50=DAR DID NOT EQUAL 2 AFTER SECOND X-FER
                                        ;ERROR51=WC FAILED TO OVERFLOW ON READ CONTINUE
                                        ;ERROR52=CMA DID NOT EQUAL OUTBUF+2 AFTER READ CONTINUE
                                        ;
                                        ;
004702  012777  177777  174106  STAI65: MOV     #177777,@WC     ;SET WC TO -1
004710  052777  000001  174076          BIS     #BIT0,@DCS      ;SET GO TO CONTINUE
004716  105777  174072                  TSTB    @DCS            ;TEST FOR RDY=0
004722  100012                          BPL     STAI66          ;RDY SET
004724  017767  174064  174136          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
004732                                  ERROR44:
004732  012767  000065  174120  ERR65:  MOV     #65,ERCOUNT     ;SET UP ERROR COUNT 65
004740  004567  003556                  JSR     R5,STAER        ;REPORT BUSY NOT SET
004744  000167  177344                  JMP     STAI56
004750  005067  174114          STAI66: CLR     WORK
004754  105777  174034          INCRD:  TSTB    @DCS            ;TST FOR RDY SET BY OVERFLOW
004760  100415                          BMI     STAI67          ;RDY SET CONTINUE
004762  005267  174102                  INC     WORK            ;WAIT FOR BUSY=0
004766  001372                          BNE     INCRD           ;GO WAIT FOR BUSY
004770  017767  174020  174072          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
004776                                  ERROR45:
004776  012767  000066  174054  ERR66:  MOV     #66,ERCOUNT     ;SET UP ERROR COUNT 66
005004  004567  003512                  JSR     R5,STAER        ;REPORT BUSY NOT CLEARED
005010  000167  177300                  JMP     STAI56          ;RESTART ROUTINE
005014  005777  173774          STAI67: TST     @DCS            ;DID AN ERROR OCCUR WHILE X-FERING
005020  100015                          BPL     STAI70          ;NO CONTINUE
005022  017767  173766  174040          MOV     @DCS,WORK       ;YES! CONTENTS OF DCS
005030  017767  173770  174034          MOV     @DAE,WORK1      ;EXT ERROR BITS
005036                                  ERROR46:
005036  012767  000067  174014  ERR67:  MOV     #67,ERCOUNT     ;SET UP ERROR COUNT 67
005044  004567  003524                  JSR     R5,STAER1       ;REPORT ERROR OCCURRED
005050  000167  175340                  JMP     STAI22          ;RESTART ROUTINE
005054  005777  173744          STAI70: TST     @DAE            ;DID DAE INC. BY DATA WAS X-FERED
005060  001412                          BEQ     STAI71          ;OK IT DID NOT INC
005062  017767  173736  174000          MOV     @DAE,WORK       ;ERROR IT INCREMENTED
005070                                  ERROR47:
005070  012767  000070  173762  ERR70:  MOV     #70,ERCOUNT     ;SET UP ERROR COUNT 70
005076  004567  003420                  JSR     R5,STAER        ;REPORT DAE INCREMENTED
005102  000167  177206                  JMP     STAI56
005106  017767  173710  173754  STAI71: MOV     @DAR,WORK       ;DID DAR INCREMENT ON CONTINUE
005114  012767  000002  173750          MOV     #2,WORK1        ;WHAT DAR SHOULD CONTAIN
005122  026767  173744  173740          CMP     WORK1,WORK      ;IS DAR CORRECT
005130  001407                          BEQ     STAI72          ;DAR OK
005132                                  ERROR50:
005132  012767  000071  173720  ERR71:  MOV     #71,ERCOUNT     ;SET UP ERROR COUNT 71
005140  004567  003430                  JSR     R5,STAER1       ;REPORT DAR INCORRECT
```

```
  837  005144  000167  177144                    JMP     STAI56          ;RESTART ROUTINE
  838  005150  017767  173642  173712  STAI72:   MOV     @WC,WORK        ;FETCH WORD COUNT
  839  005156  001407                            BEQ     STAI73          ;WORD COUNT OVERFLOWED
  840  005160                            EROR51:
  841  005160  012767  000072  173672  ERR72:    MOV     #72,ERCOUNT     ;SET UP ERROR COUNT 72
  842  005166  004567  003330                    JSR     %5,STAER        ;REPORT WORD COUNT FAILED TO CLEAR
  843  005172  000167  177116                    JMP     STAI56          ;RESTART ROUTINE
  844  005176  017767  173616  173664  STAI73:   MOV     @CMA,WORK       ;FETCH CMA
  845  005204  012767  011624  173660            MOV     #OUTBUF+4,WORK1 ;WHAT CMA SHOULD EQUAL
  846  005212  026767  173654  173650            CMP     WORK1,WORK      ;IS CMA CORRECT
  847  005220  001407                            BEQ     LPST56          ;CMA WAS CORRECT
  848  005222                            EROR52:
  849  005222  012767  000073  173630  ERR73:    MOV     #73,ERCOUNT     ;SET UP ERROR COUNT 73
  850  005230  004567  003340                    JSR     %5,STAER1       ;REPORT CMA INCORRECT
  851  005234  000167  177054                    JMP     STAI56          ;RESTART ROUTINE
  852  005240  000004                    LPST56: SCOPE                   ;ENTER SCOPE LOOP
  853  005242  004314                            STAI56
```

```
                                        ;
                                        ;IN THIS STATIC TEST THE ABILITY OF THE DISK CONTROL
                                        ;TO INCREMENT THE TRACK REGISTER WILL BE TESTED.
                                        ;
                                        ;A ONE WORD WRITE WILL BE EXECUTED
                                        ;DAE=0
                                        ;DAR=177777
                                        ;WC=-1
                                        ;CMA=OUTBUF
                                        ;
                                        ;AT THE COMPLETION OF THE WRITE
                                        ;DAR=0
                                        ;DAE=1
                                        ;
005244  052777  000400  173542  STAI74: BIS     #BIT8,@DCS      ;CLEAR THE DISK
005252  012777  177777  173536          MOV     #177777,@WC     ;SET WORD COUNT TO -1
005260  012777  011620  173532          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
005266  005077  173532                  CLR     @DAE            ;CLEAR EXT. ADDR BITS
005272  012777  177777  173522          MOV     #177777,@DAR    ;SET DAR TO ALL ONES
005300  012777  000003  173506          MOV     #3,@DCS         ;GO WRITE ONE WORD
005306  005067  173556                  CLR     WORK            ;LET'S WAIT FOR COMPLETION
005312  105777  173476          LTSWT:  TSTB    @DCS            ;TEST FOR NOT BUSY
005316  100414                  BMI     STAI75          ;X-FER COMPLETE
005320  005267  173544                  INC     WORK            ;+1 WAIT REG.
005324  001372                  BNE     LTSWT           ;GO WAIT FOR NOT BUSY
005326  017767  173462  173534          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
005334  012767  000074  173516  ERR74:  MOV     #74,ERCOUNT     ;SET UP ERROR COUNT 74
005342  004567  003154                  JSR     %5,STAER        ;REPORT ERROR X-FER NEVER COMPLETED
005346  000736                  BR      STAI74          ;RESTART ROUTINE
005350  005777  173446          STAI75: TST     @DAR            ;DOES DAR=0
005354  001412                  BEQ     STAI76          ;DAR OK
005356  017767  173440  173504          MOV     @DAR,WORK       ;FETCH DAR
005364  012767  000075  173466  ERR75:  MOV     #75,ERCOUNT     ;SET UP ERROR COUNT 75
005372  004567  003124                  JSR     %5,STAER        ;REPORT DAR DID NOT INC TO 0
005376  000167  177642                  JMP     STAI74          ;ERROR RE-START ROUTINE
005402  017767  173416  173460  STAI76: MOV     @DAE,WORK       ;FETCH DAE
005410  042767  177774  173452          BIC     #177774,WORK    ;CLEAR DISK AND ERROR BITS
005416  022767  000001  173444          CMP     #1,WORK         ;DID DAE INC
005424  001410                  BEQ     LPST74          ;DAE SHOULD EQUAL 1
005426  012767  000001  173436          MOV     #1,WORK1        ;WHAT DAE SHOULD CONTAIN
005434  012767  000076  173416  ERR76:  MOV     #76,ERCOUNT     ;SET UP ERROR COUNT 76
005442  004567  003126                  JSR     %5,STAER1       ;REPORT DAE NOT CORRECT
005446  000004          LPST74: SCOPE                           ;ENTER SCOPE LOOP
005450  005244                  STAI74
```

```
                                        ;
                                        ;IN THIS ROUTINE THE ABILITY OF THE CONTROL
                                        ;TO INCREMENT THE DISK NO. IS CHECKED
                                        ;
                                        ;ROUTINE PARAMETERS AT START
                                        ;DAE=0000X3     (X=EXISTING DISK NO)
                                        ;DAR=177777
                                        ;WC=-1
                                        ;CMA=OUTBUF
                                        ;DCS=3
                                        ;
                                        ;PARAMETERS AT THE END OF ROUTINE
                                        ;DAE=X+1
                                        ;DAR=0
                                        ;WC=0
                                        ;CMA=OUTBUF+2
                                        ;DCS=0
                                        ;
                                        ;
005452  016767  173356  173412  STA177: MOV     FLAG,WORK1      ;FETCH PROGRAM FLAG
005460  042767  177743  173404          BIC     #177743,WORK1   ;MASK DISK NO.
005466  052767  000003  173376          BIS     #3,WORK1        ;SET ADDR EXT. BITS
005474  016777  173372  173322          MOV     WORK1,@DAE      ;SET DAE REG
005502  012777  177777  173312          MOV     #177777,@DAR    ;DAR EQUALS ALL ONES
005510  012777  177777  173300          MOV     #177777,@WC     ;WORD COUNT SET FOR ONE WORD
005516  012777  011620  173274          MOV     #OUTBUF,@CMA    ;CURRENT ADDRESS SET UP
005524  052777  000003  173262          BIS     #3,@DCS         ;GO WRITE
005532  105777  173256                  TSTB    @DCS            ;IS RDY CLEARED
005536  100011                          BPL     STA100          ;
005540  017767  173250  173322          MOV     @DCS,WORK       ;FETCH CONTROL BUG
005546  012767  000077  173304  ERR77:  MOV     #77,ERCOUNT     ;SET UP ERROR COUNT 77
005554  004567  002742                  JSR     %5,STAER        ;REPORT BUSY NOT SET
005560  000734                          BR      STA177          ;RESTART ROUTINE
005562  005067  173302          STA100: CLR     WORK
005566  105777  173222          INXDSK: TSTB    @DCS            ;IS X-FER COMPLETE
005572  100415                          BMI     STA101
005574  005267  173270                  INC     WORK            ;TEST READY SHOULD BE SET
005600  001372                          BNE     INXDSK          ;GO CHECK AGAIN
005602  017767  173206  173260          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
005610  012767  000100  173242  ERR100: MOV     #100,ERCOUNT    ;SET UP ERROR COUNT 100
005616  004567  002700                  JSR     %5,STAER        ;REPORT X-FER NOT COMPLETE
005622  000167  177624                  JMP     STA177          ;RESTART ROUTINE
005626  005777  173170          STA101: TST     @DAR            ;IS DAR CLEARED
005632  001412                          BEQ     STA102          ;YES
005634  017767  173162  173226          MOV     @DAR,WORK       ;FETCH DAR ITS NOT CLEAR
005642  012767  000101  173210  ERR101: MOV     #101,ERCOUNT    ;SET UP ERROR COUNT 101
005650  004567  002646                  JSR     %5,STAER        ;REPORT DAR NOT CLEAR.
005654  000167  177572                  JMP     STA177          ;RESTART ROUTINE
005660  005267  173206          STA102: INC     WORK1           ;DAE SHOULD=THIS AT END X-FER
005664  026777  173202  173132          CMP     WORK1,@DAE      ;IS DAE CORRECT
005672  001412                          BEQ     LPST77          ;DAE IS CORRECT
005674  017767  173124  173166          MOV     @DAE,WORK       ;FETCH CONTENTS OF DAE
005702  012767  000102  173150  ERR102: MOV     #102,ERCOUNT    ;SET UP ERROR COUNT 102
```

```
   953  005710  004567  002660                    JSR     %5,STAEP1       ;REPORT DAE INCORRECT
   954  005714  000167  177532                    JMP     STAI77          ;RESTART ROUTINE
   955  005720  000004                    LPST77: SCOPE                   ;ENTER SCOPE LOOP
   956  005722  005452                            STAI77
```

```
                                        ;
                                        ;
                                        ;IN THIS ROUTINE THE PROGRAM WILL GENERATE A
                                        ;NON-EXISTENT DISK ERROR THIS WILL BE DONE
                                        ;BY ATTEMPING A 2 WORD WRITE ON DISK 7
                                        ;THE LAST TRACK AND THE LAST WORD ON THE
                                        ;LAST TRACK
                                        ;
                                        ;IF DISK 7 IS THERE WE WILL RECEIVE
                                        ;A NON-EXISTENT DISK ERROR WITH OVERFLOW
                                        ;SET
                                        ;
                                        ;IF DISK 7 IS NOT THERE WE WILL
                                        ;JUST RECEIVE A NON-EXISTENT DISK ERROR
                                        ;
                                        ;
                                        ;
                                        ;
005724  052777  000400  173062  STA103: BIS     #BIT8,@DCS      ;CLEAR THE DISK
005732  012777  000037  173064         MOV     #37,@DAE        ;SET ALL EXT ADDR, BITS
005740  012777  177777  173054         MOV     #177777,@DAR    ;SET DAR=TO ALL ONES
005746  012777  177776  173042         MOV     #177776,@WC     ;WORD COUNT=-2
005754  012777  011620  173036         MOV     #OUTBUF,@CMA    ;CURRENT ADDRESS=OUTBUF
005762  052777  000003  173024         BIS     #3,@DCS         ;GO WRITE
005770  005067  173074                 CLR     WORK
005774  105777  173014         WAFBUS: TSTB    @DCS            ;IS RDY SET
006000  100414                 BMI     STA104          ;YES EXIT
006002  005267  173062                 INC     WORK            ;NO BUSY STILL SET
006006  001372                 BNE     WAFBUS          ;GO WAIT FOR BUSY=0
006010  017767  173000  173052         MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
006016  012767  000103  173034 ERR103: MOV     #103,ERCOUNT    ;SET UP ERROR COUNT 103
006024  004567  002472                 JSR     %5,STAER        ;REPORT BUSY SET
006030  000735                 BR      STA103          ;RESTART ROUTINE
006032  032777  004000  172754 STA104: BIT     #BIT11,@DCS     ;IS NCD SET
006040  001011                 BNE     STA105          ;YES! IS ERROR SET
006042  017767  172746  173020         MOV     @DCS,WORK       ;FETCH DCS
006050  012767  000104  173002 ERR104: MOV     #104,ERCOUNT    ;SET UP ERROR COUNT 104
006056  004567  002440                 JSR     %5,STAER        ;REPORT NEED NOT SET
006062  000720                 BR      STA103          ;RESTART ROUTINE
006064  005777  172724         STA105: TST     @DCS            ;IS ERROR FLAG SET
006070  100411                 BMI     LPSX103         ;ERROR IS SET
006072  017767  172716  172770         MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
006100  012767  000105  172752 ERR105: MOV     #105,ERCOUNT    ;SET UP ERROR COUNT 105
006106  004567  002410                 JSR     %5,STAER        ;REPORT ERROR NOT SET
006112  000704                 BR      STA103          ;RESTART ROUTINE
006114  000004         LPSX103:SCOPE                   ;ENTER SCOPE LOOP
006116  005724                 STA103
```

```
                                        ;
                                        ;IN THIS TEST THE FEATURE OF CURRENT
                                        ;ADDRESS INHIBIT IS TESTED
                                        ;
                                        ;DO A ONE WORD WRITE AND SEE
                                        ;IF CMA INCREMENTED AFTER THE X-FER
                                        ;
                                        ;
006120  052777  000400  172666  ST105X: BIS     @#BIT8,@#DCS      ;CLEAR THE DISK
006126  012777  011620  172664          MOV     #OUTBUF,@#CMA     ;SET UP CURRENT ADDR
006134  012777  177777  172654          MOV     #-1,@#WC          ;SET WORD COUNT TO -1
006142  052777  000400  172654          BIS     @#BIT8,@#DAE      ;SET CURRENT ADDR, INHIBIT
006150  105777  172640                  TSTB    @#DCS             ;TEST FOR READY
006154  100406                          BMI     LPX105            ;BRANCH IF READY SET
006156  012767  000106  172674  ERR106: MOV     #106,ERCOUNT      ;SET UP ERROR COUNT 106
006164  004567  002332                  JSR     %5,STAER          ;REPORT READY NOT SET
006170  000753                          BR      ST105X            ;TRY AGAIN
006172  012777  000003  172614  LPX105: MOV     #3,@#DCS          ;GO WRITE
006200  105777  172610                  TSTB    @#DCS             ;TEST FOR NOT RDY
006204  100006                          BPL     LPX106            ;BRANCH IF RDY=0
006206  012767  000107  172644  ERR107: MOV     #107,ERCOUNT      ;SET UP ERROR COUNT 107
006214  004567  002302                  JSR     %5,STAER          ;REPORT RDY NOT CLEARED BY CMD.
006220  000737                          BR      ST105X            ;LOOP ON ERROR
006222  005067  172642          LPX106: CLR     WORK
006226  105777  172562          WATRDY: TSTB    @#DCS
006232  100411                          BMI     LPX107            ;BRANCH IF RDY SET
006234  005267  172630                  INC     WORK              ;WAIT FOR RDY
006240  001372                          BNE     WATRDY
006242  012767  000110  172610  ERR110: MOV     #110,ERCOUNT      ;SET UP ERROR COUNT 110
006250  004567  002246                  JSR     %5,STAER          ;READY NEVER SET AFTER X-FER
006254  000721                          BR      ST105X            ;LOOP ON ERROR
006256  012767  011620  172606  LPX107: MOV     #OUTBUF,WORK1     ;WHAT CMA SHOULD BE
006264  017767  172530  172576          MOV     @#CMA,WORK        ;WHAT CMA IS
006272  026767  172572  172572          CMP     WORK,WORK1        ;COMPARE
006300  001406                          BEQ     LPX108            ;BRANCH IF EQUAL
006302  012767  000111  172550  ERR111: MOV     #111,ERCOUNT      ;SET UP ERROR COUNT 111
006310  004567  002260                  JSR     %5,STAER1         ;REPORT THEY DID NOT CMP
006314  000701                          BR      ST105X            ;LOOP ON ERROR
006316  000004          LPX108: SCOPE                             ;ENTER SCOPE LOOP
006320  006120                  ST105X
```

```
1045                                    ;
1046                                    ;IN THIS ROUTINE THE ABILITY OF NON-EXISTENT
1047                                    ;MEMORY ERROR IS CHECK.
1048                                    ;
1049                                    ;TRANSFER TWO WORDS STARTING WITH THE
1050                                    ;LARGEST ADDRESSABLE MEMORY LOCATION IN THE
1051                                    ;PDP-11
1052                                    ;
1053                                    ;
1054  006322  052777  000400  172464  NXMTSM: BIS     #BIT8,@DCS      ;CLEAR THE DISK
1055  006330  012777  000340  172444          MOV     #340,@PS        ;LOCK UP PROCESSOR
1056  006336  012777  177776  172452          MOV     #-2,@WC         ;SET UP WORD COUNT
1057  006344  012777  177776  172446          MOV     #177776,@CMA    ;SET UP CURRENT ADDRESS
1058  006352  052777  000063  172434          BIS     #63,@DCS        ;ISSUE WRITE
1059  006360  005067  172504                  CLR     WORK
1060  006364  005777  172424          INCNEM: TST     @DCS            ;TEST FOR ERROR
1061  006370  100430                          BMI     TSTNEM          ;BRANCH IF ERROR SET
1062  006372  105777  172416                  TSTB    @DCS            ;TEST FOR ERROR
1063  006376  100414                          BMI     RDYERX          ;REPORT NEM NOT SET
1064  006400  005267  172464                  INC     WORK            ;WAIT FOR ERROR
1065  006404  001367                          BNE     INCNEM
1066  006406  012767  000112  172444  ERR112: MOV     #112,ERCOUNT    ;SET UP ERROR COUNT 112
1067  006414  017767  172374  172446          MOV     @DCS,WORK       ;FETCH DCS FOR REPORT
1068  006422  004567  002074                  JSR     %5,STAER        ;REPORT ERROR
1069  006426  000735                          BR      NXMTSM          ;LOOP ON ERROR
1070  006430                          RDYERX:
1071  006430  012767  000113  172422  ERR113: MOV     #113,ERCOUNT    ;SET UP ERROR COUNT 113
1072  006436  017767  172352  172424          MOV     @DCS,WORK       ;REPORT TIME OUT
1073  006444  004567  002052                  JSR     %5,STAER        ;CONTROL NEVER COMPLETED WRITE
1074  006450  000724                          BR      NXMTSM          ;LOOP ON ERROR
1075  006452  032777  040000  172334  TSTNEM: BIT     #BIT14,@DCS
1076  006460  001011                          BNE     HWDOK           ;BRANCH IF HARD ERROR SET
1077  006462  012767  000114  172370  ERR114: MOV     #114,ERCOUNT    ;SET UP ERROR COUNT 114
1078  006470  017767  172320  172372          MOV     @DCS,WORK       ;REPORT HWD NOT SET BY NEM
1079  006476  004567  002020                  JSR     %5,STAER        ;REPORT HWD NOT SET
1080  006502  000707                          BR      NXMTSM          ;LOOP ON ERROR
1081  006504  032777  002000  172312  HWDOK:  BIT     #BIT10,@DAE     ;TEST FOR NEM SET
1082  006512  001011                          BNE     CLRNEM          ;NEM SET BE X-FER OK
1083  006514  012767  000115  172336  ERR115: MOV     #115,ERCOUNT    ;SET UP ERROR COUNT 115
1084  006522  017767  172276  172340          MOV     @DAE,WORK       ;REPORT HARD ERROR REGISTER
1085  006530  004567  001766                  JSR     %5,STAER        ;REPORT NEM NOT SET BY X-FER
1086  006534  000672                          BR      NXMTSM          ;LOOP ON ERROR
1087  006536  052777  000400  172250  CLRNEM: BIS     #BIT8,@DCS      ;CLEAR THE DISK
1088  006544  022777  000200  172242          CMP     #200,@DCS       ;IS ERROR CLEARED
1089  006552  001412                          BEQ     CKHWD           ;ERROR FLAG CLEARED
1090  006554  012767  000116  172276  ERR116: MOV     #116,ERCOUNT    ;SET UP ERROR COUNT 116
1091  006562  017767  172226  172300          MOV     @DCS,WORK       ;ERROR NOT CLEARED BY DISK CLEAR
1092  006570  004567  001726                  JSR     %5,STAER        ;REPORT ERROR
1093  006574  000167  177522                  JMP     NXMTSM          ;LOOP ON ERROR
1094  006600  032777  040000  172206  CKHWD:  BIT     #BIT14,@DCS     ;IS HARD ERROR SET
1095  006606  001412                          BEQ     CKNEM           ;HWD CLEARED BY DISK CLEAR
1096  006610  012767  000117  172242  ERR117: MOV     #117,ERCOUNT    ;SET UP ERROR COUNT 117
1097  006616  017767  172172  172244          MOV     @DCS,WORK       ;REPORT HWD NOT CLEARED
1098  006624  004567  001672                  JSR     %5,STAER        ;
```

```
 1099  006630  000167  177466                      JMP     NXMTSM          ;LOOP ON ERROR
 1100  006634  032777  002000  172162  CKNEM:      BIT     #BIT10,@DAE     ;IS NEM CLEARED BY DISK CLEAR
 1101  006642  001412                              BEQ     LPNEM           ;NEM CLEARED BY DISK CLEAR
 1102  006644  012767  000120  172206  ERR120:     MOV     #120,ERCOUNT    ;SET UP ERROR COUNT 120
 1103  006652  017767  172146  172210              MOV     @DAE,WORK       ;REPORT NEM NOT CLEARED BY DISK CLEAR
 1104  006660  004567  001636                      JSR     R5,STAER
 1105  006664  000167  177432                      JMP     NXMTSM          ;LOOP ON ERROR
 1106  006670  000004                  LPNEM:      SCOPE                   ;ENTER SCOPE LOOP
 1107  006672  006322                              NXMTSM
```

```
1108
1109                                    ;
1110                                    ;IN THIS ROUTINE THE PROGRAM WILL TEST
1111                                    ;THAT THE DISK WILL ONLY TRAP
1112                                    ;AT BR5 ONLY WHEN A INTERRUPT IS GENERATED
1113                                    ;BY CLEARING THE DONE
1114                                    ;PROCESSOR OPERATING AT PRIORITY7
1115                                    ;
1116  006674  012767  007000  171302  STA106: MOV     #INT106,204     ;SET UP INTERRUPT VECTOR
1117  006702  012777  000340  172072          MOV     #340,@PS        ;LOCK OUT ALL INTERRUPTS
1118  006710  005077  172110                  CLR     @DAE            ;CLEAR ADDRESS REGISTERS
1119  006714  005077  172102                  CLR     @DAR
1120  006720  012777  177777  172070          MOV     #177777,@WC     ;SET WORD COUNT TO -1
1121  006726  012777  011620  172064          MOV     #OUTBUF,@CMA    ;LOAD CURRENT ADDRESS
1122  006734  052777  000103  172052          BIS     #103,@DCS       ;GO WRITE (INTERRUPT ENABLED)
1123  006742  005000                          CLR     %0              ;WAIT FOR RDY
1124  006744  005200                          INC     %0
1125  006746  001376                          BNE     .-2
1126  006750  105777  172040                  TSTB    @DCS            ;IS CONTROL STILL NOT RDY
1127  006754  100423                          BMI     LP106           ;NO
1128  006756  017767  172032  172104          MOV     @DCS,WORK       ;YES!
1129  006764  012767  000121  172066  ERR121: MOV     #121,ERCOUNT    ;SET UP ERROR COUNT 121
1130  006772  004567  001524                  JSR     %5,STAER        ;REPORT CONTROL STILL BUSY
1131  006776  000414                          BR      STA110
1132                                    ;
1133                                    ;PROCESSOR SHOULD NOT TRAP TO INT106
1134                                    ;PROCESSOR PRIORITY IS LOCKED AT 7
1135                                    ;
1136  007000                            INT106:
1137  007000  012767  000122  172052  ERR122: MOV     #122,ERCOUNT    ;SET UP ERROR COUNT 122
1138  007006  017767  171770  172054          MOV     @PS,WORK        ;FETCH PROCESSOR PRIORITY
1139  007014  022626                          CMP     (6)+,(6)+
1140  007016  004567  001500                  JSR     %5,STAER        ;REPORT DISK INTERRUPTED
1141  007022  000724                          BR      STA106
1142  007024  000004                  LP106:  SCOPE                   ;ENTER SCOPE LOOP
1143  007026  006674                          STA106
```

```
                                        ;
                                        ;IN THIS ROUTINE THE PROGRAM WILL TEST
                                        ;THAT THE DISK WILL ONLY TRAP
                                        ;AT BR5 ONLY WHEN A INTERRUPT IS GENERATED
                                        ;BY CLEARING THE DONE
                                        ;PROCESSOR OPERATING AT PRIORITY6
                                        ;
007030  012767  007134  171146  STA110: MOV     #INT110,204     ;SET UP INTERRUPT VECTOR
007036  012777  000300  171736          MOV     #300,@PS        ;LOCK OUT ALL INTERRUPTS ABOVE
007044  005077  171754                  CLR     @DAE            ;CLEAR ADDRESS REGISTERS
007050  005077  171746                  CLR     @DAR
007054  012777  177777  171734          MOV     #177777,@WC     ;SET WORD COUNT TO -1
007062  012777  011620  171730          MOV     #OUTBUF,@CMA    ;LOAD CURRENT ADDRESS
007070  052777  000103  171716          BIS     #103,@DCS       ;GO WRITE (INTERRUPT ENABLED)
007076  005000                          CLR     %0              ;WAIT FOR NOT BUSY
007100  005200                          INC     %0
007102  001376                          BNE     .-2
007104  105777  171704                  TSTB    @DCS            ;IS CONTROL STILL BUSY
007110  100423                          BMI     LP110           ;NO
007112  017767  171676  171750          MOV     @DCS,WORK       ;YES!
007120  012767  000123  171732  ERR123: MOV     #123,ERCOUNT    ;SET UP ERROR COUNT 123
007126  004567  001370                  JSR     %5,STAER        ;REPORT CONTROL STILL BUSY
007132  000414                          BR      STA112
                                        ;
                                        ;PROCESSOR SHOULD NOT TRAP TO INT106
                                        ;PROCESSOR PRIORITY IS LOCKED AT 6
                                        ;
007134                                  INT110:
007134  012767  000124  171716  ERR124: MOV     #124,ERCOUNT    ;SET UP ERROR COUNT 124
007142  017767  171634  171720          MOV     @PS,WORK        ;FETCH PROCESSOR PRIORITY
007150  022626                          CMP     (6)+,(6)+
007152  004567  001344                  JSR     %5,STAER        ;REPORT DISK INTERRUPTED
007156  000402                          BR      STA112
                                        ;
007160  000004          LP110:  SCOPE                   ;ENTER SCOPE LOOP
007162  007030                  STA110
                                        ;
                                        ;IN THIS ROUTINE THE PROGRAM WILL TEST
                                        ;THAT THE DISK WILL ONLY TRAP
                                        ;AT BR5 ONLY WHEN A INTERRUPT IS GENERATED
                                        ;BY CLEARING THE DONE
                                        ;PROCESSOR OPERATING AT PRIORITY5
                                        ;
007164  012767  007270  171012  STA112: MOV     #INT112,204     ;SET UP INTERRUPT VECTOR
007172  012777  000240  171602          MOV     #240,@PS        ;LOCK OUT ALL INTERRUPTS ABOVE
007200  005077  171620                  CLR     @DAE            ;CLEAR ADDRESS REGISTERS
007204  005077  171612                  CLR     @DAR
007210  012777  177777  171600          MOV     #177777,@WC     ;SET WORD COUNT TO -1
007216  012777  011620  171574          MOV     #OUTBUF,@CMA    ;LOAD CURRENT ADDRESS
007224  052777  000103  171562          BIS     #103,@DCS       ;GO WRITE (INTERRUPT ENABLED)
007232  005000                          CLR     %0              ;WAIT FOR NOT BUSY
007234  005200                          INC     %0
007236  001376                          BNE     .-2
```

```
1198  007240  105777  171550                  TSTB    @DCS            ;IS CONTROL STILL BUSY
1199  007244  100423                          BMI     LP112           ;NO
1200  007246  017767  171542  171614          MOV     @DCS,WORK       ;YES!
1201  007254  012767  000125  171576  ERR125: MOV     #125,ERCOUNT    ;SET UP ERROR COUNT 125
1202  007262  004567  001234                  JSR     %5,STAER        ;REPORT CONTROL STILL BUSY
1203  007266  000414                          BR      STA114
1204                                  ;
1205                                  ;PROCESSOR SHOULD NOT TRAP TO INT106
1206                                  ;PROCESSOR PRIORITY IS LOCKED AT 7
1207                                  ;
1208  007270                          INT112:
1209  007270  012767  000126  171562  ERR126: MOV     #126,ERCOUNT    ;SET UP ERROR COUNT 126
1210  007276  017767  171500  171564          MOV     @PS,WORK        ;FETCH PROCESSOP PRIORITY
1211  007304  022626                          CMP     (6)+,(6)+
1212  007306  004567  001210                  JSR     %5,STAER        ;REPORT DISK INTERRUPTED
1213  007312  000402                          BR      STA114
1214                                  ;
1215  007314  000004                  LP112:  SCOPE                   ;ENTER SCOPE LOOP
1216  007316  007164                          STA112
1217                                  ;
1218                                  ;
1219                                  ;
1220                                  ;THIS ROUTINE WILL TEST THE ABILITY OF THE DISK CONTROL
1221                                  ;TO TRAP AT BR5 WHEN THE DONE FLAG IS SET.
1222                                  ;
1223  007320  052777  000400  171466  STA114: BIS     #BIT8,@DCS      ;CLEAR THE DISK
1224  007326  012767  007424  170650          MOV     #INT114,204     ;SET UP DISK TRAP VECTOR
1225  007334  012777  000200  171440          MOV     #200,@PS        ;SET PROCESSOR TO PRIOPITY 4
1226  007342  005077  171456                  CLR     @DAE            ;CLEAR EXT ADDRESS BITS
1227  007346  005077  171450                  CLR     @DAR            ;CLEAP LOW ORDER ADDRESS BITS
1228  007352  012777  177777  171436          MOV     #177777,@WC     ;SET WORD COUNT TO -1
1229  007360  012777  011620  171432          MOV     #OUTBUF,@CMA    ;LOAD CURRENT ADDRESS
1230  007366  052777  000103  171420          BIS     #103,@DCS       ;WRITE (INTERRUPT ENABLE
1231  007374  005000                          CLR     %0
1232  007376  005200                          INC     %0              ;WAIT FOR INTERRUPT TO OCCUR
1233  007400  001376                          BNE     .-2
1234  007402  012767  000127  171450  ERR127: MOV     #127,ERCOUNT    ;SET UP ERROR COUNT 127
1235  007410  017767  171400  171452          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
1236  007416  004567  001100                  JSR     %5,STAER        ;REPORT INTERRUPT NO INTERRUPT
1237  007422  000403                          BR      ADT1            ;RESTART ROUTINE
1238                                  ;
1239                                  ;
1240                                  ;
1241  007424  022626                  INT114: CMP     (6)+,(6)+       ;TRAP OK
1242  007426  000004                          SCOPE                   ;ENTER SCOPE LOOP
1243  007430  007320                          STA114
1244                                  ;* * * ADDRESS TEST 1 * * *
1245                                  ;EXECUTE A ONE WORD WRITE
1246                                  ;IF THE TIMING ON THE DISK IS CORRECT
1247                                  ;THE TERMINATING ADDRESS IN THE DAR REGISTER
1248                                  ;WILL EQUAL THE ADDRESS +1 OF THE WORD
1249                                  ;THAT WAS WRITTEN
1250                                  ;
1251                                  ;NOTE: DATA IS NOT CHECKED IN THIS TEST.
```

```
1252                                        ;
1253  007432  012706  001000          ADT1: MOV     #1000,%6          ;SET UP STACK
1254  007436  012767  000001  171374        MOV     #1,WRDCT          ;SET UP WORD COUNT
1255  007444  012767  011620  171376        MOV     #OUTBUF,BUF       ;SET UP CURRENT ADDRESS
1256  007452  005067  171366               CLR     DMA
1257  007456  005067  171360               CLR     TRACK
1258  007462  052777  000400  171324 WRADT: BIS     #BIT8,@DCS        ;CLEAR THE DISK
1259  007470  104403                       WRITE
1260  007472  105777  171316               TSTB    @DCS              ;CHECK FOR READY
1261  007476  100375                       BPL     .-4
1262  007500  005777  171310               TST     @DCS              ;CHECK FOR ERROR
1263  007504  100011                       BPL     CHKADT            ;BRANCH IF NO ERROR
1264  007506  017767  171302  171354        MOV     @DCS,WORK
1265  007514  012767  000130  171336 ERR130: MOV     #130,ERCOUNT      ;SET UP ERROR COUNT 130
1266  007522  004567  000774               JSR     %5,STAER          ;REPORT ERROR
1267  007526  000755                       BR      WRADT             ;LOOP ON ERROR
1268  007530  016767  171310  171334 CHKADT: MOV     DMA,WORK1
1269  007536  005267  171330               INC     WORK1             ;WHAT DAR SHOULD CONTAIN
1270  007542  017767  171254  171320        MOV     @DAR,WORK
1271  007550  026767  171316  171312        CMP     WORK1,WORK        ;IS DAR CORRECT
1272  007556  001406                       BEQ     INCDAR            ;YES DAR IS CORRECT
1273  007560  012767  000131  171272 ERR131: MOV     #131,ERCOUNT      ;SET UP ERROR COUNT 131
1274  007566  004567  001002               JSR     %5,STAER1         ;REPORT DAR NOT CORRECT
1275  007572  000733                       BR      WRADT             ;LOOP ON ERROR
1276  007574  022767  004000  171270 INCDAR: CMP     #4000,WORK1       ;IS IT THE LAST ADDR.
1277  007602  001405                       BEQ     LPADT             ;LAST ADDRESS EXIT
1278  007604  016767  171262  171232        MOV     WORK1,DMA         ;SET UP FOR NEXT ADDR.
1279  007612  000167  177644               JMP     WRADT             ;CHECK NEXT ADDRESS
1280  007616  032777  004000  171154 LPADT: BIT     #BIT11,@SWR       ;LOOP ON TEST
1281  007624  001402                       BEQ     .+6               ;NO:
1282  007626  000167  177600               JMP     ADT1              ;YES: BIT11 SET IN SWR
1283                                      ;
1284                                      ;
1285                                      ;
1286                                      ;
1287                                      ;
1288                                      ;* * * ADDRESS TEST 2X  * * *
1289                                      ;EXECUTE A ONE WORD READ
1290                                      ;IF THE TIMING ON THE DISK IS CORRECT
1291                                      ;THE TERMINATING ADDRESS IN THE DAR REGISTER
1292                                      ;WILL EQUAL THE ADDRESS +1 OF THE WORD
1293                                      ;THAT WAS READ
1294                                      ;NOTE: DATA IS NOT CHECK IN THIS TEST.
1295                                      ;
1296  007632  012706  001000          ADT2X: MOV     #1000,%6          ;SET UP STACK
1297  007636  012767  000001  171174        MOV     #1,WRDCT          ;SET UP WORD COUNT
1298  007644  012767  011630  171176        MOV     #INBUF,BUF        ;SET UP CURRENT ADDRESS
1299  007652  005067  171166               CLR     DMA
1300  007656  005067  171160               CLR     TRACK
1301  007662  052777  000400  171124 ROADT: BIS     #BIT8,@DCS        ;CLEAR THE DISK
1302  007670  104405                       READ
1303  007672  105777  171116               TSTB    @DCS              ;CHECK FOR READY
1304  007676  100375                       BPL     .-4
1305  007700  005777  171110               TST     @DCS              ;CHECK FOR ERROR
```

```
1306  007704  100011                          BPL     XCHKDT          ;BRANCH IF NO ERROR
1307  007706  017767  171102  171154          MOV     #DCS,WORK
1308  007714  012767  000132  171136  ERR132: MOV     #132,ERCOUNT    ;SET UP ERROR COUNT 132
1309  007722  004567  000574                  JSR     %5,STAER        ;REPORT ERROR
1310  007726  000755                          BR      ROADT           ;LOOP ON ERROR
1311  007730  016767  171110  171134  XCHKDT: MOV     DMA,WORK1
1312  007736  005267  171130                  INC     WORK1           ;WHAT DAR SHOULD CONTAIN
1313  007742  017767  171054  171120          MOV     #DAR,WORK
1314  007750  026767  171116  171112          CMP     WORK1,WORK      ;IS DAR CORRECT
1315  007756  001406                          BEQ     ADDAR           ;YES DAR IS CORRECT
1316  007760  012767  000133  171072  ERR133: MOV     #133,ERCOUNT    ;SET UP ERROR COUNT 133
1317  007766  004567  000602                  JSR     %5,STAER1       ;REPORT DAR NOT CORRECT
1318  007772  000733                          BR      ROADT           ;LOOP ON ERROR
1319  007774  022767  004000  171070  ADDAR:  CMP     #4000,WORK1     ;IS IT THE LAST ADDR.
```

```
1320  010002  001405                          BEQ     LPADT2          ;LAST ADDRESS EXIT
1321  010004  016767  171062  171032          MOV     WORK1,DMA       ;SET UP FOR NEXT ADDR
1322  010012  000167  177644                  JMP     ROADT           ;CHECK NEXT ADDRESS
1323  010016  032777  004000  170754  LPADT2: BIT     #BIT11,@SWR     ;LOOP ON TEST
1324  010024  001402                          BEQ     .+6             ;NO:
1325  010026  000167  177600                  JMP     ADT2X           ;YES: BIT11 SET IN SWR
1326                                  ;
1327                                  ;
1328                                  ;
1329                                  ;
1330                                  ;
1331
1332  010032  104001                          EMT+1                   ;REPORT END
1333  010034  011542                          END
1334  010036  013700  000042                  MOV     @#42,R0         ;GET MONITOR ADDRESS
1335  010042  001404                          BEQ     LXIT            ;SKIP IF NOT MONITOR LOAD
1336  010044  004710                  LOGICAL:        JSR     7,(0)   ;GO TO MONITOR
1337  010046  000240                          NOP
1338  010050  000240                          NOP
1339  010052  000240                          NOP
1340  010054  000167  171142          LXIT:   JMP     STA11           ;RESTART TEST
1341                                  ;
1342                                  ;SCOPE LOOP ROUTINE
1343                                  ;IF BIT 11 SET LOOP ON TEST
1344                                  ;
1345  010060  032777  004000  170712  LOOP:   BIT     #BIT11,@SWR     ;TST FOR BIT 11
1346  010066  001402                          BEQ     .+6             ;BIT 11 NOT SET
1347  010070  013646                          MOV     @(6)+,-(6)
1348  010072  000002                          RTI                     ;BIT 11 SET; LOOP ON TEST
1349  010074  005767  170766                  TST     PASS            ;TEST TO SET UP PASS COUNT
1350  010100  001003                          BNE     .+10            ;PASS COUNT SET
1351  010102  012767  000025  170756          MOV     #25,PASS        ;SET UP PASS COUNT
1352  010110  005367  170752                  DEC     PASS            ;SUB. -1 EACH PASS
1353  010114  001402                          BEQ     .+6
1354  010116  013646                          MOV     @(6)+,-(6)
1355  010120  000002                          RTI                     ;LOOP ON TEST
1356  010122  062716  000002                  ADD     #2,(6)          ;INDEX POINTER FOR NEXT TEST
1357  010126  000002                          RTI                     ;EXIT TO NEXT TEST
```

```
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;ENTER DISK HANDLER BY THE TRAP INSTRUCTION
                                        ;ARGUMENT TO TRAP INSTRUCTION IS TWO ORDER
                                        ;BYTE OF THE CONTROL REGISTER.
                                        ;
010130  016705  170672          DISK:   MOV     DBR,@5          ;SET UP TO LOAD DISK REG
010134  016745  170702                  MOV     TRACK,-(5)      ;LOAD TRACK NUMBER
010140  016745  170700                  MOV     DMA,-(5)        ;LOAD WORD ADDRESS
010144  016745  170700                  MOV     BUF,-(5)        ;SET UP CURRENT ADDRESS
010150  016745  170664                  MOV     WRDCT,-(5)      ;LOAD WORD COUNT
010154  005115                          COM     (5)             ;SET UP TWO'S COMPLEMENT
010156  005215                          INC     (5)
010160  011604                          MOV     (6),@4
010162  014467  170702                  MOV     -(4),WORK       ;
010166  042767  177600  170674          BIC     @177600,WORK    ;MASK FUNCTION BITS
010174  016745  170670                  MOV     WORK,-(5)       ;LOAD FUNCTION REG.
010200  000002                          RTI                     ;RETURN FROM TRAP
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
```

```
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;ROUTINE TO ALLOW THE OPERATOR TO SET BITS
                                        ;IN THE I/O REGISTERS VIA THE SWITCH REGISTER
                                        ;
                                        ;WORD COUNT REGISTER
010202  017777  170572  170606 SELWC:  MOV     @SWR,@WC                ;MOV SWR INTO WORD COUNT REG
010210  000774                         BR      SELWC
                                        ;
                                        ;CURRENT ADDRESS REGISTER
010212  017777  170562  170600 SELCMA: MOV     @SWR,@CMA               ;MOV SWR INTO CURRENT ADDR REG
010220  000774                         BR      SELCMA
                                        ;
                                        ;DISK ADDRESS REGISTER
010222  017777  170552  170572 SELDAR: MOV     @SWR,@DAR               ;MOV SWR INTO DISK ADDR REG
010230  000774                         BR      SELDAR
                                        ;
                                        ;DISK ADDRESS EXT AND ERROR REGISTER
010232  017777  170542  170564 SELDAE: MOV     @SWR,@DAE               ;MOV SWR INTO DISK ADDR EXT REG
010240  000774                         BR      SELDAE
                                        ;
                                        ;DATA BUFFER REGISTER
010242  017777  170532  170556 SELDBR: MOV     @SWR,@DBR               ; MOV SWR INTO DATA BUFFER
010250  000774                         BR      SELDBR
                                        ;
                                        ;
                                        ;LOOK AHEAD REGISTER
010252  017700  170554         MOVLK:  MOV     @ADS,$0                 ;FETCH LOOK AHEAD
010256  000005                         RESET                           ;DISPLAY IN LIGHTS
010260  000005                         RESET                           ;
010262  000773                         BR      MOVLK
                                        ;
                                        ;DISK CONTROL STATUS REGISTER
010264  012777  000340  170510 SELDCS: MOV     #340,@PS                ;LOCK UP INTERRUPTS
010272  012777  177777  170516         MOV     #177777,@WC             ;SET WORD COUNT =1 WORD
010300  012777  011620  170512         MOV     #OUTBUF,@CMA            ;SET UP CURRENT ADDRESS
010306  017777  170466  170500         MOV     @SWR,@DCS               ;MOV SWR INTO CONTROL REG
010314  032777  000001  170472         BIT     #BIT0,@DCS              ;IS FUNCTION BITS SET
010322  001760                         BEQ     SELDCS                  ;FUNCTION BITS NOT SET
010324  105777  170464         DKBUSY: TSTB    @DCS                    ;TEST FOR DISK READY
010330  100375                         BPL     DKBUSY                  ;DISK STILL NOT READY
010332  000754                         BR      SELDCS                  ;DISK NOT BUSY SELECT NEW CR
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
```

```
                                        ;
                                        ;THIS ROUTINE ENABLES THE OPERATOR TO SELECT A TRACK STATICLY
                                        ;THE ROUTINE DOES A ONE WORD READ TO SELECT THE TRACK
                                        ;THE OPERATOR MAY CHANGE THE SWITCH REGISTER AT ANY TIME
                                        ;SWR6-0 EQUALS THE TRACK NUMBER
                                        ;SWR9-7 EQUALS THE DISK NUMBER
                                        ;
010334  052777  000400  170452  STAMP:  BIS     #BIT8,@DCS
010342  017767  170432  170522          MOV     @SWR,WORK1      ;FETCH SWR
010350  016767  170516  170512          MOV     WORK1,WORK
010356  042767  176000  170504          BIC     #176000,WORK    ;MASK DISK AND TRACK NO.
010364  006067  170500                  ROR     WORK
010370  006067  170474                  ROR     WORK
010374  006067  170470                  ROR     WORK
010400  006067  170464                  ROR     WORK
010404  006067  170460                  ROR     WORK
010410  016777  170454  170406          MOV     WORK,@DAE       ;DISK EXT. ADDR. REG. LOADED
010416  017767  170356  170444          MOV     @SWR,WORK
010424  000367  170440                  SWAB    WORK
010430  006167  170434                  ROL     WORK
010434  006167  170430                  ROL     WORK
010440  006167  170424                  ROL     WORK
010444  042767  003777  170416          BIC     #3777,WORK
010452  016777  170412  170342          MOV     WORK,@DAR       ;DISK ADDRESS REG LOADED
010460  012777  011630  170332          MOV     #INBUF,@CMA     ;LOAD CURRENT ADDRESS
010466  012777  177777  170322          MOV     #177777,@WC     ;LOAD WORD COUNT
010474  052777  000005  170312          BIS     #5,@DCS         ;GO AND READ
010502  105777  170306          CTBUSY: TSTB    @DCS            ;TEST FOR CONTROL READY
010506  100375                  BPL     CTBUSY          ;WAIT FOR CONTROL READY
010510  026777  170356  170262  SRCHG:  CMP     WORK1,@SWR
010516  001306                  BNE     STAMP           ;SWR HAS CHANGED
010520  000773                  BR      SRCHG           ;SWR HAS NOT CHANGED
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
```

```
1480
1481                                    ;
1482                                    ;ROUTINE TO REPORT ERROR COUNT AND CONTENTS OF ONE REGISTER
1483                                    ;
1484  010522  004567  000404           STAER:  JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1485  010526  001070                           WORK                    ;DATA TO BE CONVERTED
1486  010530  011522                           MES6                    ;ADDRESS OF MESSAGE
1487  010532  000006                           6
1488  010534  004567  000372                   JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1489  010540  001060                           ERCOUNT                 ;ERROR COUNT TO BE CONVERTED
1490  010542  011456                           MED5                    ;ADDRESS OF MESSAGE
1491  010544  000003                           3
1492  010546  104000                           EMT     +0              ;REPORT MESSAGE
1493  010550  011454                           MED5A
1494  010552  011456                           MED5
1495  010554  011522                           MES6
1496  010556  177777                           -1
1497  010560  032777  002000  170212          BIT     @BIT10,@SWR
1498  010566  001401                           BEQ     .+4
1499  010570  000000                           HALT
1500  010572  000205                           RTS     %5              ;EXIT ROUTINE
1501                                    ;
1502                                    ;ROUTINE TO REPORT ERROR COUNT AND THE CONTENTS OF TWO REGISTERS
1503                                    ;
1504                                    ;
1505                                    ;
1506  010574  004567  000332           STAER1: JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1507  010600  001070                           WORK                    ;DATA TO BE CONVERTED
1508  010602  011522                           MES6                    ;ADDRESS OF MESSAGE
1509  010604  000006                           6
1510  010606  004567  000320                   JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1511  010612  001072                           WORK1                   ;DATA TO BE CONVERT
1512  010614  011477                           MES5                    ;ADDRESS OF MESSAGE
1513  010616  000006                           6
1514  010620  004567  000306                   JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1515  010624  001060                           ERCOUNT                 ;ERROR COUNT TO BE CONVERTED
1516  010626  011456                           MED5                    ;ADDRESS OF MESSAGE
1517  010630  000003                           3
1518  010632  104000                           EMT     +0              ;REPORT MESSAGE
1519  010634  011454                           MED5A
1520  010636  011456                           MED5
1521  010640  011477                           MES5
1522  010642  011522                           MES6
1523  010644  177777                           -1
1524  010646  032777  002000  170124          BIT     @BIT10,@SWR
1525  010654  001401                           BEQ     .+4
1526  010656  000000                           HALT
1527  010660  000205                           RTS     %5              ;EXIT ROUTINE
1528                                    ;
1529                                    ;
1530                                    ;ROUTINE TO DECODE EMT CALLS
1531                                    ;EMT+1=TYPE ONE LINE OF TEXT
1532                                    ;EMT+0=TYPE A SERIES OF LINES
1533  010662  011600                   EMTRP:  MOV     (6),%0
```

```
  1534  010664  022740  104001                CMP     @EMT+1,#(0)     ;WAS THE CALL EMT+1
  1535  010670  001103                        BNE     TYPS            ;NO! TYPE A SERIES OF LINES OF TEXT
  1536  010672  000400                        BR      TYP             ;YES TYPE ONE LINE OF TEXT
```

```
1537
1538                                    ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
1539  010674  011600                    TYP:    MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1540  010676  062716  000002                    ADD     #2,@%6          ;SET UP EXIT.
1541  010702  011000                            MOV     @%0,%0          ;ADDRESS OF MESSAGE TO R0.
1542  010704  112067  000164            TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
1543  010710  122767  000100  000156            CMPB    #100,TYPDAT     ;CHECK FOR "@" CHARACTER
1544  010716  001005                            BNE     TYPC            ;BRANCH IF NOT "@".
1545  010720  005067  000150                    CLR     TYPDAT          ;OUTPUT NULL TO
1546  010724  004767  000030                    JSR     %7,TYPD         ;CLEAR BUFFER
1547  010730  000002                            RTI                     ;TERMINATOR CHAR, DONE, EXIT.
1548  010732  122767  000045  000134  TYPC:   CMPB    #45,TYPDAT      ;CHECK FOR "%".
1549  010740  001442                            BEQ     TYPF            ;BRANCH IF "%".
1550  010742  122767  000042  000124            CMPB    #42,TYPDAT      ;NOT "%", CHECK FOR "*".
1551  010750  001443                            BEQ     TYPG            ;BRANCH IF "*"
1552  010752  004767  000002                    JSR     %7,TYPD         ;TYPE CHAR IN TYPDAT
1553  010756  000752                            BR      TYPA
1554  010760  032777  040000  170012  TYPD:   BIT     #BIT14,@SWR
1555  010766  001026                            BNE     TYEXIT
1556  010770  116777  000100  170006            MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
1557  010776  105777  170006                    TSTB    @TPS            ;WAIT FOR DONE FLAG.
1558  011002  100375                            BPL     .-4
1559  011004  122767  000015  000062            CMPB    #15,TYPDAT      ;CHECK FOR CR
1560  011012  001003                            BNE     1$              ;NO - SKIP
1561  011014  012767  000011  000054            MOV     #9.,NULL        ;SET NULL COUNTER
1562  011022  005767  000050            1$:     TST     NULL            ;TEST COUNTER
1563  011026  001406                            BEQ     TYEXIT          ;ZERO - EXIT
1564  011030  005367  000042                    DEC     NULL            ;DECREMENT
1565  011034  116767  166740  000032            MOVB    0,TYPDAT        ;ZERO OUTPUT
1566  011042  000746                            BR      TYPD            ;OUTPUT NULL
1567  011044  000207                    TYEXIT: RTS     %7              ;EXIT
1568  011046  112767  000015  000020  TYPF:   MOVB    #15,TYPDAT      ;MOVE CARRIAGE RETURN CODE TO TYPDAT
1569  011054  004767  177700                    JSR     %7,TYPD         ;GO TYPE CHAR.
1570  011060  112767  000012  000006  TYPG:   MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT.
1571  011066  004767  177666                    JSR     %7,TYPD         ;GO TYPE CHAR.
1572  011072  000704                            BR      TYPA
1573  011074  000000                    TYPDAT: 0
1574  011076  000000                    NULL:   0
1575                                    ;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
1576  011100  011600                    TYPS:   MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1577  011102  062716  000002                    ADD     #2,@%6          ;UPDATE TO NEXT MESSAGE ADDRESS
1578  011106  011067  000014                    MOV     @%0,TYPSB       ;ADDRESS OF MESSAGE TO TYPSB
1579  011112  022767  177777  000006            CMP     #-1,TYPSB       ;CHECK FOR TERMINATOR
1580  011120  001001                            BNE     TYPSA           ;BRANCH IF NOT TERMINATOR.
1581  011122  000002                            RTI                     ;TERMINATOR, EXIT
1582  011124  104001                    TYPSA:  EMT     +1              ;CALL ON TYP SUB TO TYPE MESSAGE
1583  011126  000000                    TYPSB:  0                       ;ADDRESS OF MESSAGE GOES HERE
1584  011130  000763                            BR      TYPS            ;GO PROCESS NEXT MESSAGE
1585                                    ;
1586                                    ;
1587                                    ;
1588                                    ;
1589                                    ;OCTAL TO ASCII CONVERT ROUTINE
1590                                    ;
```

```
 1591                                   ;ENTER ROUTINE AS FOLLOWS
 1592                                   ;JSR%5,CONV
 1593                                   ;ADDR=ADDRESS OF NUMBER TO BE CONVERTED
 1594                                   ;ADDR BYTE=LSB OF WHERE ASCII IS GOING
 1595                                   ;ASCII=THE NUMBER OF ASCII CHAR. TO BE CONVERTED
 1596                                   ;
 1597                                   ;
 1598  011132  013567  000054  CONV:    MOV     @(5)+,ACNVX     ;VALUE OF # TO BE CONVERTED
 1599  011136  012501                   MOV     (5)+,%1         ;ASCII ADDR
 1600  011140  012502                   MOV     (5)+,%2         ;# OF ASCII CHAR
 1601  011142  060201                   ADD     %2,%1
```

```
1602
1603  011144  016703  000042          ACVN:   MOV     ACNVX,%3
1604  011150  042703  177770                  BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT OCTAL#
1605  011154  062703  000060                  ADD     #60,%3          ;SET UP ASCII#
1606  011160  110341                          MOVB    %3,-(1)         ;STORE ASCII CHAR
1607  011162  042767  000007  000022          BIC     #7,ACNVX
1608  011170  006067  000016                  ROR     ACNVX           ;ROTATE OCTAL#
1609  011174  006067  000012                  ROR     ACNVX
1610  011200  006067  000006                  ROR     ACNVX
1611  011204  005302                          DEC     %2              ;-1 FROM ASCII CHAR COUNT
1612  011206  001356                          BNE     ACVN
1613  011210  000205                          RTS     %5              ;EXIT # CONVERTED
1614  011212  000000          ACNVX:  0                               ;WORK REGISTER
1615                          ;
1616                          ;
1617                          ;POWER DOWN ROUTINE
1618                          ;ABORT DISK AND HALT
1619                          ;
1620  011214  052777  000400  167572  DOWN:   BIS     #BIT8,@DCS      ;ABORT DISK
1621  011222  012767  011232  166574          MOV     #UP,24
1622  011230  000000                          HALT
1623                          ;
1624  011232  012767  011214  166564  UP:     MOV     #DOWN,24
1625  011240  012706  001000                  MOV     #1000,%6
1626  011244  012767  177324  167616          MOV     #-300,, WORK
1627  011252  000005          TIMCNT: RESET
1628  011254  005267  167610                  INC     WORK            ;TIMEOUT
1629  011260  001374                          BNE     TIMCNT
1630  011262  104001                          EMT+1                   ;REPORT
1631  011264  011574                          PRWF
1632  011266  000167  167604                  JMP     START           ;START TEST
1633                          ;
1634                          ;
1635                          ;
1636                          ;ROUTINE TO SET ACTION ENABLE OF MA/MF PARITY MEMORIES
1637                          ;CALL JSR PC,MAMF
1638
1639          172100          PARCSR=172100
1640          000114          PARVEC=114
1641          000004          ERRVEC=4
1642          000006          SP=%6
1643
1644  011272  012737  011364  000114  MAMF:   MOV     #PARSRV,@#PARVEC;SET PARITY INTERRUPT VECTOR
1645  011300  012737  000340  000116          MOV     #340,@#PARVEC+2 ;AND PRIORITY LEVEL 7 ON INTERRUPT
1646  011306  013746  000004                  MOV     @#ERRVEC,-(SP)  ;SAVE CURRENT ERROR VECTOR
1647  011312  013746  000006                  MOV     @#ERRVEC+2,-(SP)        ;AND PRIORITY LEVEL
1648  011316  012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC
1649  011324  012737  000002  000006          MOV     #PTI,@#ERRVEC+2
1650  011332  012700  172100                  MOV     #PARCSR,%0      ;GET FIRST CSR ADDRESS
1651  011336  012702  000001                  MOV     #1,%2
1652  011342  012720  000001          18:     MOV     #1,(0)+         ;SET ACTION ENABLE IF AVAILABLE
1653  011346  006302                          ASL     %2              ;SHIFT AVAILABILITY INDICATOR
1654  011350  103374                          BCC     18
1655  011352  012637  000006                  MOV     (SP)+,@#ERRVEC+2 ;RESTORE ERROR VECTOR
```

```
1656  011356  012637  000004                  MOV     (SP)+,@#ERRVEC  ;PRIORITY LEVEL AND INTERRUPT VECTOR
1657  011362  000207                          RTS     %7
1658                                  ;PARITY ERROR SERVICE ROUTINE
1659                                  ;WHEN A PARITY ERROR IS DETECTED THE ROUTINE SEARCHES
1660                                  ;MEMORY FOR THE PARITY ERROR, WHEN THE ERROR
1661                                  ;IS DETECTED THE PROGRAM HALTS WITH THE ADDRESS
1662                                  ;CAUSING THE ERROR IN R0.
1663                                  ;TO CONTINUE PRESS CONTINUE.
1664  011364  104001                  PARSRV: EMT+1
1665  011366  011547                          PARERR
1666  011370  012737  011416  000114          MOV     #2$,@#PARVEC    ;REPOSITION PATRYT ERROR INTERRUPT
1667  011376  012737  011444  000004          MOV     #4$,@#ERRVEC    ;SET TIME OUT TRAP
1668  011404  005037  000006                  CLR     @#ERRVEC+2
1669  011410  005000                          CLR     %0
1670  011412  005720                  1$:     TST     (0)+            ;SCAN MEMORY
1671  011414  000776                          BR      1$
1672  011416  000000                  2$:     HALT                    ;PARITY ERROR - ADDRESS CAUSING
1673                                          ;ERROR IS IN REGISTER 0
1674  011420  000005                  3$:     RESET
1675  011422  012737  011364  000114          MOV     #PARSRV,@#PARVEC        ;RESTORE PARITY VECTOR
1676  011430  012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC ;RESTORE TIME OUT HALT
1677  011436  004767  177630                  JSR     %7,MAMF
1678  011442  000002                          RTI
1679  011444  000000                  4$:     HALT                    ;ERROR - PARITY ERROR NOT DETECTED ON SCAN,
1680  011446  000764                          BR      3$              ;@(SP) CONTAINS PC WHERE
1681                                          ;PARITY ERROR WAS ORIGINALLY DETECTED.
```

```
1682
1683  011450  000000                  TEXBUF: 0
1684  011452  000000                  TSTCH:  0
1685                                  ;
1686                                  ;
1687                                  ;
1688                                  ;
1689                                  ;
1690                                  ;ERROR MESSAGE HEADERS
1691                                  ;
1692
1693                                        .EVEN
1694  011454  040045                  HED5A:  .ASCII  /%@/
1695  011456  020040  020040  051105  HED5:   .ASCII  /    ERROR COUNT @/
1696  011464  047522  020122  047503
1697  011472  047125  020124     100
1698                                  ;
1699                                  ;
1700                                  ;MESSAGE TRAILERS
1701                                  ;
1702                                  ;
1703                                  ;
1704                                  ;
1705  011477     040  020040  020040  MES5:   .ASCII  /       GOOD DATA  @/
1706  011504  020040  047507  042117
1707  011512  042040  052101  020101
1708  011520  040040
1709                                  ;
1710                                  ;
1711                                  ;
1712  011522  020040  020040  020040  MES6:   .ASCII  /       BAD DATA@/
1713  011530  041040  042101  042040
1714  011536  052101  040101
1715                                  ;
1716                                  ;
1717                                  ;
1718  011542  042445  042116     100  END:    .ASCII  /%END@/
1719  011547     045  042515  047515  PARERR: .ASCII  /%MEMORY PARITY ERROR@/
1720  011554  054522  050040  051101
1721  011562  052111  020131  051105
1722  011570  047522  040122
1723  011574  020045  047520  042527  PRWF:   .ASCII  /% POWER HAS FAILED@/
1724  011602  020122  040510  020123
1725  011610  040506  046111  042105
1726  011616     100
1727                                  ;
1728                                  ;
1729          011620                        .EVEN
1730  011620  000000  000000  000000  OUTBUF: .WORD   0,0,0,0
1731  011626  000000
1732                                  ;
1733                                  ;
1734  011630  000000  000000  000000  INBUF:  .WORD   0,0,0,0
1735  011636  000000
```

```
 1736                                   !
 1737                                   !
 1738                                   !
 1739                                   !
 1740          000001                            .END
```

```
ACNVX    011212          1598#   1603    1607#   1608#   1609#   1610#   1614#
ACVN     011144          1603#   1612
ADDAP    007774          1315    1319#
ADS      001032           133#   1419
ADT1     007432            79    1237    1253#   1282
ADT2X    007632            82    1296#   1325
BIT0   = 000001             6#     461     463     498     611     613     647     762     764     797    1429
BIT1   = 000002             7#
BIT10  = 002000            16#    1081    1100    1497    1524
BIT11  = 004000            17#     991    1280    1323    1345
BIT12  = 010000            18#
BIT13  = 020000            19#
BIT14  = 040000            20#    1075    1094    1554
BIT15  = 100000            21#
BIT2   = 000004             8#
BIT3   = 000010             9#
BIT4   = 000020            10#
BIT5   = 000040            11#
BIT6   = 000100            12#
BIT7   = 000200            13#
BIT8   = 000400            14#     284     308     352     375     401     422     570     722     869     976    1013    1016
                          1054    1087    1223    1258    1301    1449    1620
BIT9   = 001000            15#
BUF      001050           148#   1255#   1298#   1371
CATST1   001776           323#    325
CHKADT   007530          1263    1268#
CKHWD    006600          1089    1094#
CKNEM    006634          1095    1100#
CLRNEM   006536          1082    1087#
CMA      001020           128#    209     296#    297     307#    309     323#    324     327     424#    475     545     572#
                           624     697     724#    775     844     871#    925#    980#   1014#   1037    1057#   1121#   1157#
                          1193#   1229#   1402#   1427#   1466#
CONV     011132          1484    1488    1506    1510    1514    1598#
CTBUSY   010502          1469#   1470
DAE      001024           130#    240     387#    388     400#    402     454     519     524     526     604     676     678
                           754     818     823     825     872#    890     922#    949     951     977#   1016#   1081    1084
                          1100    1103    1118#   1154#   1190#   1226#   1410#   1458#
DAR      001022           129#    230     363#    364     374#    376     378     460     531     610     683     761     830
                           873#    884     886     923#    942     944     978#   1119#   1155#   1191#   1227#   1270    1313
                          1406#   1465#
DBR      001026           131#    250    1368    1414#
DCS      001014           126#    195     270#    271     283#    284#    285     308#    311     352#    375#    401#    422#
                           426#    427     429     436     440     446     498#    499     501     507     511     516     518
                           570#    574#    575     577     584     588     594     647#    648     650     656     660     665
                           667     722#    726#    727     729     736     740     746     797#    798     800     806     810
                           815     817     869#    874#    876     880     926#    927     929     934     938     976#    981#
                           983     987     991     993     997     999    1013#   1017    1022#   1023    1029    1054#   1058#
                          1060    1062    1067    1072    1075    1078    1087#   1088    1091    1094    1097    1122#   1126
                          1128    1158#   1162    1164    1194#   1198    1200    1223#   1230#   1235    1258#   1260    1262
                          1264    1301#   1303    1305    1307    1428#   1429    1431    1449#   1468#   1469    1620#
DISK     010130           170    1368#
DKBUSY   010324          1431#   1432
DMA      001044           146#    178#   1256#   1268    1278#   1299#   1311    1321#   1370
DOWN     011214           175    1620#   1624
```

K5

DZRFAB,BIC CROSS REFERENCE TABLE

```
ERR37    003316            550#
ERR4     001376            232#
ERR40    003412            579#
ERR41    003466            591#
ERR42    003536            601#
ERR43    003564            607#
ERR44    003626            615#
ERR45    003654            621#
ERR46    003716            629#
ERR47    003764            652#
ERR5     001426            242#
ERR50    004030            662#
ERR500   001762            320#     330      334
ERR51    004106            669      673#
ERR52    004140            680#
ERR53    004202            688#
ERR54    004230            694#
ERR55    004272            702#
ERR56    004366            731#
ERR57    004442            743#
ERR6     001456            252#
ERR60    004500            751#
ERR61    004532            758#
ERR62    004574            766#
ERR63    004622            772#
ERR64    004664            780#
ERR65    004732            802#
ERR66    004776            812#
ERR67    005036            820#
ERR7     001506            262#
ERR70    005070            827#
ERR71    005132            835#
ERR72    005160            841#
ERR73    005222            849#
ERR74    005334            881#
ERR75    005364            887#
ERR76    005434            895#
ERR77    005546            930#
FLAG     001034            142#     919
HED5     011456           1490     1494     1516     1520     1695#
HED5A    011454           1493     1519     1694#
HWDOK    006504           1076     1081#
INBUF    011630           1298     1466     1734#
INCBUS   003050            507#     510
INCDAR   007574           1272     1276#
INCNEM   006364           1060#    1065
INCRD    004754            806#     809
INCWAT   002506            435#     439
INT106   007000           1116     1136#
INT110   007134           1152     1172#
INT112   007270           1188     1208#
INT114   007424           1224     1241#
INXDSK   005566            934#     937
LOGICA   010044           1336#
```

AL

```
LOOP     010060            173    1345#
LPADT    007616           1277    1280#
LPADT2   010016           1320    1323#
LPNEM    006670           1101    1106#
LPST1    001300            201     204#
LPST10   001570            273     277#
LPST11   001640            287     290#
LPST12   001710            299     302#
LPST13   001756            310     314#
LPST14   002116            341     345#
LPST15   002160            354     357#
LPST16   002230            366     369#
LPST17   002276            377     381#
LPST2    001330            210     213#
LPST20   002346            390     393#
LPST21   002410            403     407#
LPST22   003334            548     553#
LPST3    001360            220     223#
LPST4    001410            231     234#
LPST40   004310            700     705#
LPST5    001440            241     244#
LPST56   005240            847     852#
LPST6    001470            251     254#
LPST7    001520            261     264#
LPST74   005446            893     897#
LPST77   005720            950     955#
LPSX10   006114            998    1003#
LPX105   006172           1018    1022#
LPX106   006222           1024    1028#
LPX107   006256           1030    1036#
LPX108   006316           1039    1043#
LP106    007024           1127    1142#
LP110    007160           1163    1179#
LP112    007314           1199    1215#
LTSWT    005312            876#    879
LXIT     010054           1335    1340#
MA       001030            132#    260
MAMF     011272            194    1644#   1677
MES5     011477           1512    1521    1705#
MES6     011522           1486    1495    1508    1522    1712#
MOVLK    010252             94    1419#   1422
N      = 000134              5#     198     199#    202     203#    211     212#    221     222#    232     233#    242     243#
                           252     253#    262     263#    275     276#    288     289#    300     301#    312     313#    343
                           344#    355     356#    367     368#    379     380#    391     392#    404     405#    430     432#
                           442     444#    450     452#    456     458#    464     466#    471     473#    479     481#    502
                           504#    512     514#    520     522#    527     529#    535     537#    541     543#    549     551#
                           578     580#    590     592#    600     602#    606     608#    614     616#    620     622#    628
                           630#    651     653#    661     663#    672     674#    679     681#    687     689#    693     695#
                           701     703#    730     732#    742     744#    750     752#    757     759#    765     767#    771
                           773#    779     781#    801     803#    811     813#    819     821#    826     828#    834     836#
                           840     842#    848     850#    881     882#    887     888#    895     896#    930     931#    939
                           940#    945     946#    952     953#    988     989#    994     995#   1000    1001#   1019    1020#
                          1025    1026#   1033    1034#   1040    1041#   1066    1067#   1070    1072#   1077    1078#   1083
                          1084#   1090    1091#   1096    1097#   1102    1103#   1129    1130#   1136    1138#   1165    1166#
```

DZRFAB,BIC CROSS REFERENCE TABLE

```
                    1172    1174#   1201    1202#   1208    1210#   1234    1235#   1265    1266#   1273    1274#   1308
                    1309#   1316    1317#
NULL        011076  1561#   1562    1564#   1574#
NXMTSM      006322    70    1054#   1069    1074    1080    1086    1093    1099    1105    1107
OUTBUF      011620   423#    424     476     546     571#    572     625     698     723#    724     776     845     871
                     925     980    1014    1036    1121    1157    1193    1229    1255    1427    1730#
PARCSR  =   172100  1639#   1650
PARERR      011547  1665    1719#
PARSRV      011364  1644    1664#   1675
PARVEC  =   000114  1640#   1644#   1645#   1666#   1675#
PASS        001066   155#   1349    1351#   1352#
PATNU       001046   147#
PRWF        011574  1631    1723#
PS          001002   118#    172#   1055#   1117#   1138    1153#   1174    1189#   1210    1225#   1425#
RANNU       001036   143#
RDWAT       004406   735#    739
RDYERX      006430  1063    1070#
READ    =   104405    28#   1302
ROADT       007662  1301#   1310    1318    1322
SAVE        001062   153#
SAV1        001064   154#
SCOPE   =   000004    22#    204     213     223     234     244     254     264     277     290     302     314     333
                     345     357     369     381     393     407     553     705     852     897     955    1003    1043
                    1106    1142    1179    1215    1242
SELCMA      010212    90    1402#   1403
SELDAE      010232    92    1410#   1411
SELDAR      010222    91    1406#   1407
SELDBR      010242    93    1414#   1415
SELDCS      010264    95    1425#   1430    1433
SELWC       010202    89    1398#   1399
SP      =%000006  1642#   1646#   1647#   1655    1656
SRCHG       010510  1471#   1473
STAER       010522   199     203     212     222     233     243     253     263     289     313     356     380     406
                     432     458     473     504     514     529     543     580     608     622     653     663     681
                     695     732     759     773     803     813     828     842     882     888     931     940     946
                     989     995    1001    1020    1026    1034    1068    1073    1079    1085    1092    1098    1104
                    1130    1140    1166    1176    1202    1212    1236    1266    1309    1484#
STAER1      010574   276     301     329     344     368     392     444     452     466     481     522     537     551
                     592     602     616     630     674     689     703     744     752     767     781     821     836
                     850     896     953    1041    1274    1317    1506#
STAI1       001222    38    193#    205    1340
STAI10      001524    45    270#    278
STAI11      001574    46    283#    291
STAI12      001644    48    295#    303
STAI13      001714    49    307#    315
STAI14      002052    51    338#    346
STAI15      002122    52    351#    358
STAI16      002164    54    362#    370
STAI17      002234    55    374#    382
STAI2       001304    39    208#    214
STAI20      002302    58    386#    394
STAI21      002352    59    400#    408
STAI22      002414    60    422#    433     445     453     459     467     474     482     505     515     523     530
                     538     544     552     554     822
```

DZRFAB,BIC CROSS REFERENCE TABLE

```
STAI23   002502          428    434#
STAI24   002556          437    446#
STAI25   002616          448    454#
STAI26   002644          455    460#
STAI27   002706          462    469#
STAI3    001334           40    218#   224
STAI30   002734          470    475#
STAI31   002776          478    497#
STAI32   003044          500    506#
STAI33   003110          508    516#
STAI34   003150          517    524#
STAI35   003202          525    531#
STAI36   003244          534    539#
STAI37   003272          540    545#
STAI4    001364           41    229#   235
STAI40   003340           62    570#   581    593    603    609    617    623    631    654    664    675    682
                         690    696    704    706
STAI41   003426          576    582#
STAI42   003502          585    594#
STAI43   003554          595    604#
STAI44   003602          605    610#
STAI45   003644          612    618#
STAI46   003672          619    624#
STAI47   003734          627    646#
STAI5    001414           42    239#   245
STAI50   004002          649    655#
STAI51   004046          657    665#
STAI52   004124          666    676#
STAI53   004156          677    683#
STAI54   004220          686    691#
STAI55   004246          692    697#
STAI56   004314           64    722#   733    745    753    760    768    774    782    804    814    829    837
                         843    851    853
STAI57   004402          728    734#
STAI6    001444           43    249#   255
STAI60   004456          737    746#
STAI61   004516          748    754#
STAI62   004550          756    761#
STAI63   004612          763    769#
STAI64   004640          770    775#
STAI65   004702          778    796#
STAI66   004750          799    805#
STAI67   005014          807    815#
STAI7    001474           44    259#   265
STAI70   005054          816    823#
STAI71   005106          824    830#
STAI72   005150          833    838#
STAI73   005176          839    844#
STAI74   005244           66    869#   883    889    898
STAI75   005350          877    884#
STAI76   005402          885    890#
STAI77   005452           67    919#   932    941    947    954    956
STAMP    010334           98   1449#  1472
START    001076           34    163#  1632
```

```
STA100   005562   92#   933#
STA101   005626   935   942#
STA102   005660   943   948#
STA103   005724   68#   976#   990   996   1002   1004
STA104   006032   984   991#
STA105   006064   992   997#
STA106   006674   71   1116#   1141   1143
STA110   007030   73   1131   1152#   1180
STA112   007164   75   1167   1177   1188#   1216
STA114   007320   77   1203   1213   1223#   1243
STOP     002040   321   332#
ST105X   006120   69   1013#   1021   1027   1035   1042   1044
SWR      001000   117#   1280   1323   1345   1398   1402   1406   1410   1418   1428   1450   1459   1471
                  1497   1524   1554
SWRDCT   001056   151#
TDMA     001054   150#
TEXBUF   011450   1683#
TIMCNT   011252   1627#   1629
TKB      001006   120#
TKS      001012   122#
TPB      001004   119#   1556*
TPS      001010   121#   1557
TRACK    001042   145#   177*   1257*   1300*   1369
TSTCH    011452   1684#
TSTNEM   006452   1061   1075#
TWRDCT   001052   149#
TYEXIT   011044   1555   1563   1567#
TYP      010674   1536   1539#
TYPA     010704   1542#   1553   1572
TYPC     010732   1544   1548#
TYPD     010760   1546   1552   1554#   1566   1569   1571
TYPDAT   011074   1542*   1543   1545*   1548   1550   1556   1559   1565*   1568*   1570*   1573#
TYPF     011046   1549   1568#
TYPG     011060   1551   1570#
TYPS     011100   1535   1576#   1584
TYPSA    011124   1580   1582#
TYPSR    011126   1578*   1579   1583#
UP       011232   1621   1624#
WAFBUS   005774   983#   986
WATRDY   006226   1029#   1032
WC       001016   127#   219   339*   340   342   351*   353   425*   469   497*   539   573*   618
                  646*   691   725*   769   796*   838   870*   924*   979*   1015*   1056*   1120*   1156*
                  1192*   1228*   1398*   1426*   1467*
WCBUSI   004006   656#   659
WCWAT    003432   583#   587
WORK     001070   159#   195*   196   200   209*   219*   230*   240*   250*   260*   271*   272   285*
                  286   297*   298   311*   327*   342*   353*   364*   365   378*   388*   389   402*
                  429*   434*   435*   438   440*   446*   447   454*   460*   461   469*   475*   477
                  501*   506*   509*   511*   518*   526*   531*   533   539*   545*   547   577*   582*
                  583*   586   588*   594*   596   604*   610*   611   618*   624*   626   650*   655*
                  658*   660*   667*   668   678*   683*   685   691*   697*   699   729*   734*   735*
                  738   740*   746*   747   754*   755   761*   762   769*   775*   777   800*   805*
                  808*   810*   817*   825*   830*   832   838*   844*   846   875*   878*   880*   886*
                  890*   891*   892   929*   933*   936*   938*   944*   951*   982*   985*   987*   993*
```

DZRFAB,BIC CROSS REFERENCE TABLE

DZRFAB,BIC CROSS REFERENCE TABLE

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            443   446   449   451   454   457   460   463   465   469   472   475   476   480   497
            501   503   511   513   518   519   521   526   528   531   532   536   539   542   545
            546   550   571   572   573   577   579   588   591   594   598   601   604   607   610
            613   615   618   621   624   625   629   646   650   652   660   662   667   670   673
            678   680   683   684   688   691   694   697   698   702   723   724   725   729   731
            740   743   746   749   751   754   758   761   764   766   769   772   775   776   780
            796   800   802   810   812   817   818   820   825   827   830   831   835   838   841
            844   845   849   870   871   873   874   880   881   886   887   890   894   895   919
            922   923   924   925   929   930   938   939   944   945   951   952   977   978   979
            980   987   988   993   994   999  1000  1014  1015  1019  1022  1025  1033  1036  1037
           1040  1055  1056  1057  1066  1067  1071  1072  1077  1078  1083  1084  1090  1091  1096
           1097  1102  1103  1116  1117  1120  1121  1128  1129  1137  1138  1152  1153  1156  1157
           1164  1165  1173  1174  1188  1189  1192  1193  1200  1201  1209  1210  1224  1225  1228
           1229  1234  1235  1253  1254  1255  1264  1265  1268  1270  1273  1278  1296  1297  1298
           1307  1308  1311  1313  1316  1321  1334  1347  1351  1354  1368  1369  1370  1371  1372
           1375  1376  1378  1398  1402  1406  1410  1414  1419  1425  1426  1427  1428  1450  1451
           1458  1459  1465  1466  1467  1533  1539  1541  1561  1576  1578  1598  1599  1600  1603
           1621  1624  1625  1626  1644  1645  1646  1647  1648  1649  1650  1651  1652  1655  1656
           1666  1667  1675  1676
MOVB       1542  1556  1565  1568  1570  1606
NOP        1337  1338  1339
RESET       163   193   208   218   229   239   249   259  1420  1421  1627  1674
ROL        1461  1462  1463
ROR        1453  1454  1455  1456  1457  1608  1609  1610
RTI        1348  1355  1357  1379  1547  1581  1649  1678
RTS        1500  1527  1567  1613  1657
SWAB       1460
TRAP         26    27    28
TST         309   376   438   447   516   524   586   665   676   738   747   755   815   823   884
            942   997  1060  1262  1305  1349  1562  1670
TSTB        200   427   436   499   507   575   584   648   656   727   736   798   806   876   927
            934   983  1017  1023  1029  1062  1126  1162  1198  1260  1303  1431  1469  1557
.ASCII     1694  1695  1705  1712  1718  1719  1723
.ENABL        4
.END       1740
.EVEN       114  1693  1729
.LIST         2    32   199   203   212   222   233   243   253   263   276   289   301   313   344
            356   368   380   392   405   432   444   452   458   466   473   481   504   514   522
            529   537   543   551   580   592   602   608   616   622   630   653   663   674   681
            689   695   703   732   744   752   759   767   773   781   803   813   821   828   836
            842   850   882   888   896   931   940   946   953   989   995  1001  1020  1026  1034
           1041  1067  1072  1078  1084  1091  1097  1103  1130  1138  1166  1174  1202  1210  1235
           1266  1274  1309  1317
.MACR        32
.NLIST        2    32   199   203   212   222   233   243   253   263   276   289   301   313   344
            356   368   380   392   405   432   444   452   458   466   473   481   504   514   522
            529   537   543   551   580   592   602   608   616   622   630   653   663   674   681
            689   695   703   732   744   752   759   767   773   781   803   813   821   828   836
            842   850   882   888   896   931   940   946   953   989   995  1001  1020  1026  1034
           1041  1067  1072  1078  1084  1091  1097  1103  1130  1138  1166  1174  1202  1210  1235
           1266  1274  1309  1317
.REPT        32
.TITLE        1
.WORD      1730  1734
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ERRORS DETECTED: 0

DZRFAB,BIC

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 *DZPFAB,DZRFAB/SOL/CRF_DZRFAB,BIC
 RUN-TIME:  6 13 3 SECONDS
 CORE USED:  8K
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