MAINDEC-11-D51A

RF11 DISK DATA

(STATIC PORTION)

ENTER INTERRUPT BACKGROUND TEST

SR9 SET WAIT FOR INTERRUPTS USING WAIT INSTRUCTION

RESET WAIT FOR INTERRUPTS WITH BACKGROUND TEST

LOOP ON DISK ADDRESS

SR8 SET LOOP ON DISK ADDRESS (SPECIFIED BY WORD COUNT AND DAR)

RESET CONTINUE TO NEXT DISK BUFFER AREA.

SELECT TRACK FROM SR (DURING DYNAMIC TESTING)

SR7 SET SELECT TRACK FROM SR

RESET SELECT TRACK UNDER PROGRAM CONTROL

TRACK SELECTION

6	5	4	3	2	1	0
SELECT ONE OF 177(8) TRACKS						

5.2 CONVERSATION MODE FOR PROGRAM PARAMETERS FOR DATA TEST ONLY

IN THE PROGRAM CONVERSATION MODE THE OPERATOR CAN SPECIFY ANY ONE OR ALL OF THE PROGRAM PARAMETERS.

PROGRAM CONVERSATION

DATA TEST ONLY?

IF THE OPERATOR ANSWER YES THE PROGRAM WILL ENTER ONLY THE DATA PORTION OF TEST.

MULTL DK MODE?

MULTI DISK MODE IS A MODE IN THE PROGRAM WHICH ALLOWS THE OPERATOR TO EXECISE, ALL THE DISKS ON THE SYSTEM WITHOUT RE-STARTING THE PROGRAM. THE PROGRAM AFTER EXERCISING ONE DISK WILL REPORT A MESSAGE TELLING THE OPERATOR WHICH DISK WILL BE SELECTED NEXT, AND THEN THE PROGRAM WILL EXERCISE THAT DISK. WHEN A COMPLETE PASS IS ACCOMPLISHED, A PASS COMPLETE WILL BE REPORTED AND THE TEST WILL RECYCLE.

IF THE OPERATOR ANSWERS "YES" TO THIS QUESTION, HE WILL THEN BE ASKED HOW MANY DISKS ARE ON THE SYSTEM, AND THEN THE PRECEDING QUESTION WILL BE SKIPPED. IF THE OPERATOR ANSWERS "NO" TO THIS QUESTION, THE NEXT QUESTION WILL BE SKIPPED, AND HE WILL THEN BE ASKED WHICH DISK IS TO BE EXERCISED.

OF DKS 1 TO 10 OCTAL? X

TYPE THE NUMBER OF DISKS ON THE SYSTEM, FOR MULTI DISK MODE.

EX, DK? X

WHEN NOT IN THE MULTI DISK MODE THE OPERATOR WILL HAVE TO SPECIFY WHAT DISK IS TO BE USED.

OPT, WRD CNT?

IF THE OPERATOR ANSWERS "NO" TO THIS QUESTION THE NEXT TWO QUESTIONS WILL BE DELETED FROM THE CONVERSATION.

LENGTH (1 TO 1000)? XXX

THE OPERATOR CAN SPECIFY ANY LENGTH TRANSFER FROM 1(8) TO 1 00(8) WORDS. THE NORMAL TRANSFER LENGTH IS 1000(8) WORDS UNDER PROGRAM CONTROL.

WRD ADDR? XXXX

THE OPERATOR MUST NOW SPECIFY THE STARTING WORD ADDRESS-THIS BEING ONE OF 2048(10). ADDRESS ENTRY MUST BE MADE IN OCTAL (TO 3777(8)).

(5.2 CONT'D)

OPT. DATA PAT. #?

IF NO OPTIONAL DATA PATTERN IS REQUESTED THE PROGRAM WILL EXECUTE THE FOLLOWING LIST OF DATA PATTERNS.

PATTERN 0 = 000000
" 1 = 177777
" 2 = 134510
" 3 = 043267
" 4 = 100000
" 5 = 107070
" 6 = 070707
" 7 = 125252
" 10 = 052525
" 11 = 177737
" 12 = 004102
" 13 = 136363
" 14 = 063636
" 15 = 000001
" 16 = 100005
" 17 = 000520
" 20 = 030303
" 21 = RANDOM DATA
" 22 = RUN ALL DATA PATTERNS UNDER PROGRAM CONTROL

IF THE OPERATOR DECIDES TO OPERATE UNDER PROGRAM CONTROL, THE NEXT QUESTION WILL BE SKIPPED. THE OPERATOR BY REQUESTING AN OPTIONAL DATA PATTERN HAS THE ABILITY OF SELECTING ANY ONE OF THE 21(8) DATA PATTERNS. DATA PATTERN NO. XX

DISK PROGRAM FUNCTION PARAMETERS

IN THIS SECTION OF THE PROGRAM PARAMETER CONVERSATION MODE, THE OPERATOR CAN SELECT ANYONE OR ALL THREE OF THE CONTROL FUNCTIONS TO BE EXECUTED. THE NORMAL SEQUENCE OF DISK FUNCTIONS UNDER PROGRAM CONTROL IS WRITE, WRITE CHECK, AND THEN READ. BY ENTERING THE CONVERSATION MODE THE OPERATOR HAS GAINED COMPLETE CONTROL OVER THE DISK FUNCTIONS. HE MUST SPECIFY YES OR NO TO ALL OF THE FOLLOWING QUESTIONS.

WRITE? (YES - NO)
WRITE CHECK? (YES - NO)
READ? (YES - NO)

TO PERFORM A WRITE CHECK ONLY, THE OPERATOR MUST FIRST WRITE SOME KNOWN DATA ON THE DISK. THIS COURSE OF ACTION ALSO PREVAILS FOR A READ ONLY OPERATION.
* IF AN ERROR OCCURS IN THE LINE THE OPERATOR IS TYPING, DEPRESS THE RUB-OUT. THIS CAUSES THE QUESTION TO BE RETYPED AND ALLOWS THE OPERATOR TO PROPERLY ANSWER THE QUESTION.

* INDICATES TO THE OPERATOR THAT THE CARRIAGE-RETURN SHOULD BE TYPED AT THE INDICATED PLACE TO TERMINATE THE LINE OF TYPED CHARACTERS.

5.3 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.

(5,3 CONT'D)

ADDRESS TESTS IN STATIC TEST ONLY

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 OCCURES 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 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.

(5.3 CONT'D)

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 ( ) 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 Ø 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.

(5.3 CONT'D)

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.

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 DATA ERRORS

```
DATA ERR 1 READ XXDAE XXXXXXDAR XXXXXXGD DATA XXXXXXBD DATA
         A      B     C         D             E
```

A=WHICH READ THE ERROR OCCURRED
B=THE DISK NUMBER AND EXTENDED DISK ADDRESS BITS
C=THE DISK ADDRESS REGISTER
D=THE DATA WRITTEN ON THE DISK
E=THE DATA READ FROM THE DISK

6.4 RANEX ERRORS

ERRORS WHICH OCCUR IN RANEX ALSO HAVE THE WORD COUNT REPORT WITH THE ERROR MESSAGE IN THE FOLLOWING MANNER,

```
RANEX ERR XXDAE XXXXXXDAR XXXXWRD CNT,
          A     B         C
```

A=STARTING DAE OF TRANSFER
B=STARTING DAR OF TRANSFER
C=WORD COUNT OF TRANSFER

6.5 OVERFLOW ERROR

WHEN THE DISK TRANSFERS MORE WORDS THEN ITS WORD COUNT WAS EQUAL TO, THE PROGRAM FLAGS IT,

```
EXTRA BKS XXXXXX WRD ADDR XXXXXX BD DATA
          A              B
```

A=THE LOCATION IN MEMORY WHERE THE DATA WAS TRANSFERRED
B=THE DATA THAT WAS TRANSFERRED

6.6 DISK ADDRESS ERROR

DK ADDR ERR XXDAEXXXXXXDAR

THE TERMINATING DISK ADDRESS AFTER THE TRANSFER WAS NOT CORRECT
THE DAE AND DAR SHOULD EQUAL WHAT WAS REPORTED, CHECK THE RF11
PANEL FOR THE ERROR ADDRESS.

6.7 PROCESSOR TIME OUT

CPU BKGRND TIMED OUT

THIS MESSAGE WILL BE REPORTED IF THE DISK FAILS TO RAISE A
BR REQUEST AFTER EXTENDED PERIOD OF TIME.

6.8 END

END

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

8. MISCELLANEOUS

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

8.1 SUGGESTED POWER FAIL TEST

THIS TEST IS SUGGESTED SO THAT THE ABILITY OF THE DISK TO RETAIN DATA AFTER A POWER FAILURE HAS OCCURRED MAY BE TESTED.

FOLLOW THESE STEPS IF NO ERROR OCCURS, ONE PASS SHOULD BE SUFFICIENT:

A) LOAD AND START PFT1

B) UPON RECEIVING "OK" FROM THE PROGRAM TURN OFF THE POWER TO THE MACHINE AND THEN BACK ON AGAIN.

C) THERE SHOULD BE ATMOST ONE ERROR. ANY MORE IS CONSIDERED UNRELIABLE.

D) PERFORM THE SAME STEPS WITH PFT2. THIS TIME THERE SHOULD BE NO ERRORS.

```
                020000                  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

                                        ;MACRO FOR SETTING UP ERROR COUNT
                                                .MACR   ERROR X
                                        ERR'X': MOV     #X,ERCOUNT      ;SET UP ERROR COUNT X
                                                N=N+1
                                                .ENDM
                000100                  .REPT   100
                                        .+2
                                        HALT
                                        .ENDR
000000  000002                          .+2
000002  000000                          HALT
000004  000006                          .+2
000006  000000                          HALT
000010  000012                          .+2
000012  000000                          HALT
000014  000016                          .+2
000016  000000                          HALT
000020  000022                          .+2
000022  000000                          HALT
000024  000026                          .+2
000026  000000                          HALT
000030  000032                          .+2
000032  000000                          HALT
000034  000036                          .+2
000036  000000                          HALT
000040  000042                          .+2
000042  000000                          HALT
000044  000046                          .+2
```

```
000046  000000                  HALT
000050  000052                  .+2
000052  000000                  HALT
000054  000056                  .+2
000056  000000                  HALT
000060  000062                  .+2
000062  000000                  HALT
000064  000066                  .+2
000066  000000                  HALT
000070  000072                  .+2
000072  000000                  HALT
000074  000076                  .+2
000076  000000                  HALT
000100  000102                  .+2
000102  000000                  HALT
000104  000106                  .+2
000106  000000                  HALT
000110  000112                  .+2
000112  000000                  HALT
000114  000116                  .+2
000116  000000                  HALT
000120  000122                  .+2
000122  000000                  HALT
000124  000126                  .+2
000126  000000                  HALT
000130  000132                  .+2
000132  000000                  HALT
000134  000136                  .+2
000136  000000                  HALT
000140  000142                  .+2
000142  000000                  HALT
000144  000146                  .+2
000146  000000                  HALT
000150  000152                  .+2
000152  000000                  HALT
000154  000156                  .+2
000156  000000                  HALT
000160  000162                  .+2
000162  000000                  HALT
000164  000166                  .+2
000166  000000                  HALT
000170  000172                  .+2
000172  000000                  HALT
000174  000176                  .+2
000176  000000                  HALT
000200  000202                  .+2
000202  000000                  HALT
000204  000206                  .+2
000206  000000                  HALT
000210  000212                  .+2
000212  000000                  HALT
000214  000216                  .+2
000216  000000                  HALT
000220  000222                  .+2
000222  000000                  HALT
```

```
000224  000226          .+2
000226  000000          HALT
000230  000232          .+2
000232  000000          HALT
000234  000236          .+2
000236  000000          HALT
000240  000242          .+2
000242  000000          HALT
000244  000246          .+2
000246  000000          HALT
000250  000252          .+2
000252  000000          HALT
000254  000256          .+2
000256  000000          HALT
000260  000262          .+2
000262  000000          HALT
000264  000266          .+2
000266  000000          HALT
000270  000272          .+2
000272  000000          HALT
000274  000276          .+2
000276  000000          HALT
000300  000302          .+2
000302  000000          HALT
000304  000306          .+2
000306  000000          HALT
000310  000312          .+2
000312  000000          HALT
000314  000316          .+2
000316  000000          HALT
000320  000322          .+2
000322  000000          HALT
000324  000326          .+2
000326  000000          HALT
000330  000332          .+2
000332  000000          HALT
000334  000336          .+2
000336  000000          HALT
000340  000342          .+2
000342  000000          HALT
000344  000346          .+2
000346  000000          HALT
000350  000352          .+2
000352  000000          HALT
000354  000356          .+2
000356  000000          HALT
000360  000362          .+2
000362  000000          HALT
000364  000366          .+2
000366  000000          HALT
000370  000372          .+2
000372  000000          HALT
000374  000376          .+2
000376  000000          HALT
```

```
                000200                  .=200
000200  000167  000672                  JMP     START

                                        ;STATIC ROUTINES
                000300                          .=300
000300  000167  000702                          JMP     STAI1           ;TEST RESET TO CONTROL REGISTER
000304  000167  000754                          JMP     STAI2           ;TEST RESET TO CURRENT ADDRESS REGISTER
000310  000167  001000                          JMP     STAI3           ;TEST RESET TO WORD COUNT REGISTER
000314  000167  001024                          JMP     STAI4           ;TEST RESET TO DISK ADDRESS REGISTER
000320  000167  001050                          JMP     STAI5           ;TEST RESET TO DISK EXT. ADDRESS REGISTER
000324  000167  001074                          JMP     STAI6           ;TEST RESET TO DATE BUFFER REGISTER
000330  000167  001120                          JMP     STAI7           ;TEST RESET TO MAINTENANCE REGISTER
000334  000167  001144                          JMP     STAI10          ;CAN WE SET W/R BITS IN DCS REGISTER
000340  000167  001210                          JMP     STAI11          ;CAN WE CLEAR THE DCS REGISTER
                                                                        ;USING DISK CLEAR,
000344  000167  001254                          JMP     STAI12          ;CAN WE SET ALL CMA BITS
000350  000167  001320                          JMP     STAI13          ;CAN WE CLEAR ALL CMA BITS
                                                                        ;USING DISK CLEAR
000354  000167  001362                          JMP     STAI14          ;CAN WE SET ALL WC BITS
000360  000167  001426                          JMP     STAI15          ;CAN WE CLEAR ALL WC BITS
                                                                        ;USING DISK CLEAR
000364  000167  001464                          JMP     STAI16          ;CAN WE SET ALL THE DAR BITS
000370  000167  001530                          JMP     STAI17          ;CAN WE CLEAR ALL THE DAR BITS
                                                                        ;USING DISK CLEAR
```

```
000374  000167  001572                JMP     STAI20          ;CAN WE SET ALL THE DAE BITS
000400  000167  001636                JMP     STAI21          ;CAN WE CLEAR ALL THE DAE BITS, USING DISK CLEAR
000404  000167  001674                JMP     STAI22          ;EXECUTE A ONE WORD WRITE
                                                              ;FOLLOWED BY A ONE WORD WRITE CONTINUE
000410  000167  002614                JMP     STAI40          ;EXECUTE A ONE WORD WRITE CHECK
                                                              ;FOLLOWED BY A ONE WORD WRITE CHECK CONTINUE
000414  000167  003564                JMP     STAI56          ;EXECUTE A ONE WORD READ
                                                              ;FOLLOWED BY A ONE WORD READ CONTINUE
000420  000167  004510                JMP     STAI74          ;TEST TRACK INCREMENT
000424  000167  004712                JMP     STAI77          ;TEST DISK INCREMENT
000430  000167  005160                JMP     STA103          ;TEST THAT NED RAISES ERROR FLAG
000434  000167  005350                JMP     ST105X          ;CHECK CMA INHIBIT
000440  000167  005546                JMP     NXMTSM          ;TEST NON-EXISTENT MEMORY ERROR
000444  000167  006110                JMP     STA106          ;TEST THAT THE DISK WILL NOT TRAP
                                                              ;AT PRIORITY 7
000450  000167  006240                JMP     STA110          ;TEST THAT THE DISK WILL NOT TRAP
                                                              ;AT PRIORITY 6
000454  000167  006370                JMP     STA112          ;TEST THAT THE DISK WILL NOT TRAP
                                                              ;AT PRIORITY 5
000460  000167  006520                JMP     STA114          ;TEAST THAT THE DISK WILL TRAP
                                                              ;AT PRIORITY 4
000464  000167  006626                JMP     ADT1            ;ADDRESS TEST 1
                                                              ;CHECK TIMING BY EXECUTING
                                                              ;A ONE WORD WRITE
000470  000167  007022                JMP     ADT2X           ;ADDRESS TEST 2
                                                              ;CHECK TIMING BY EXECUTING
                                                              ;A ONE WORD READ
        000650                  .=650
                                ;
                                ;MAINTENANCE ROUTINES
                                ;
000650  000167  007174                JMP     SELWC           ;LOAD WORD COUNT REG WITH SR
000654  000167  007200                JMP     SELCMA          ;LOAD CURRENT ADDRESS REG WITH SR
000660  000167  007204                JMP     SELDAR          ;LOAD DISK ADDRESS REG WITH SR
000664  000167  007210                JMP     SELDAE          ;LOAD DISK EXT. ADDRESS REG WITH SR
000670  000167  007214                JMP     SELDBR          ;LOAD DATA BUFFER REG WITH SR
000674  000167  007220                JMP     MOVLK           ;MOVE LOOK AHEAD INTO LIGHTS
000700  000167  007226                JMP     SELDCS          ;LOAD FUNCTION REG WITH SR
                                ;
                                ;
000704  000167  007272                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)
                                ;
```

```
001000                  .=1000
```

```
        001000                          .EVEN
                                        ;
                                        ;I/O ADDRESS POINTERS
001000  177570                          SR:     177570                  ;SWITCH REGISTER
001002  177776                          CSR:    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 (OUT=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  010530  176676          MOV     #EMTRP,30       ;SET UP TTY POINTER
001132  012767  000340  176672          MOV     #340,32         ;LOCK UP INTERRUPTS
001140  012767  007776  176666          MOV     #DISK,34        ;SET UP DISK HANDLER POINTER
001146  012767  000340  176662          MOV     #340,36         ;LOCK UP INTERRRUPTS
001154  012777  000340  177620          MOV     #340,@CSR       ;LOCK UP INTERRUPT LEVELS
001162  012767  007726  176630          MOV     #LOOP,20        ;SET UP FOR SCOPE LOOP
001170  012767  000340  176624          MOV     #340,22         ;LOCK UP PRIORITY
001176  005067  177640                  CLR     TRACK           ;CLEAR TRACK REGISTERS
001202  005067  177636                  CLR     DMA             ;CLEAR DAR REGISTERS
```

```
                                ;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
001206  000005                  STAI1:  RESET                   ;CLEAR THE WORLD
001210  017767  177600  177652          MOV     @DCS,WORK       ;FETCH CONTROL REGISTER
001216  032767  177577  177644          BIT     #177577,WORK    ;IS IT CLEARED
001224  001405                          BEQ     XSTAI1          ;REGISTER OK (TEST READY)
                                        ERROR   \N
001226  012767  000000  177624  ERR0:   MOV     #0,ERCOUNT      ;SET UP ERROR COUNT 0
        000001                          N=N+1
001234  004567  007130                  JSR     %5,STAER        ;REPORT STATIC ERROR
001240  105767  177624          XSTAI1: TSTB    WORK            ;TEST FOR READY
001244  001005                          BNE     LPST1           ;BRANCH IF READY
                                        ERROR   \N
001246  012767  000001  177604  ERR1:   MOV     #1,ERCOUNT      ;SET UP ERROR COUNT 1
        000002                          N=N+1
001254  004567  007110                  JSR     %5,STAER        ;REPORT READY NOT SET
001260  000004                  LPST1:  SCOPE                   ;ENTER SCOPE LOOP
001262  001206                          STAI1
                                ;TEST CURRENT ADDRESS REGISTER
                                ;
001264  000005                  STAI2:  RESET                   ;CLEAR THE WORLD
001266  017767  177526  177574          MOV     @CMA,WORK       ;FETCH CMA REGISTER
001274  001405                          BEQ     LPST2           ;REGISTER OK
                                        ERROR   \N
001276  012767  000002  177554  ERR2:   MOV     #2,ERCOUNT      ;SET UP ERROR COUNT 2
        000003                          N=N+1
001304  004567  007060                  JSR     %5,STAER        ;REPORT ERROR
001310  000004                  LPST2:  SCOPE                   ;ENTER SCOPE LOOP
001312  001264                          STAI2
                                ;
                                ;TEST WORD COUNT REGISTER
                                ;
001314  000005                  STAI3:  RESET                   ;CLEAR THE WORLD
001316  017767  177474  177544          MOV     @WC,WORK        ;FETCH WC REG.
001324  001405                          BEQ     LPST3           ;REGISTER OK
                                        ERROR   \N
001326  012767  000003  177524  ERR3:   MOV     #3,ERCOUNT      ;SET UP ERROR COUNT 3
        000004                          N=N+1
001334  004567  007030                  JSR     %5,STAER        ;REPORT ERROR
001340  000004                  LPST3:  SCOPE                   ;ENTER SCOPE LOOP
001342  001314                          STAI3
```

```
                                        ;
                                        ;TEST DISK ADDRESS REGISTER
                                        ;
001344  000005                  STAI4:  RESET                   ;CLEAR THE WORLD
001346  017767  177450  177514          MOV     @DAR,WORK       ;FETCH DAR REGISTER
001354  001405                          BEQ     LPST4           ;REGISTER CLEARED
                                        ERROR   \N
001356  012767  000004  177474  ERR4:   MOV     #4,ERCOUNT      ;SET UP ERROR COUNT 4
        000005                          N=N+1
001364  004567  007020                  JSR     %5,STAER        ;REPORT ERROR
001370  000004                  LPST4:  SCOPE                   ;ENTER SCOPE LOOP
001372  001344                          STAI4
                                        ;
                                        ;TEST DISK EXT. ADDRESS REGISTER
                                        ;
001374  000005                  STAI5:  RESET                   ;CLEAR THE WORLD
001376  017767  177422  177464          MOV     @DAE,WORK       ;FETCH DAE REGISTERS
001404  001405                          BEQ     LPST5           ;DAE CLEARED
                                        ERROR   \N
001406  012767  000005  177444  ERR5:   MOV     #5,ERCOUNT      ;SET UP ERROR COUNT 5
        000006                          N=N+1
001414  004567  006750                  JSR     %5,STAER        ;REPORT ERROR
001420  000004                  LPST5:  SCOPE                   ;ENTER SCOPE LOOP
001422  001374                          STAI5
                                        ;
                                        ;TEST DATA BUFFER REGISTER
                                        ;
001424  000005                  STAI6:  RESET                   ;CLEAR THE WORLD
001426  017767  177374  177434          MOV     @DBR,WORK       ;FETCH DBR REGISTER
001434  001405                          BEQ     LPST6           ;DBR CLEARED
                                        ERROR   \N
001436  012767  000006  177414  ERR6:   MOV     #6,ERCOUNT      ;SET UP ERROR COUNT 6
        000007                          N=N+1
001444  004567  006720                  JSR     %5,STAER        ;REPORT ERROR
001450  000004                  LPST6:  SCOPE                   ;ENTER SCOPE LOOP
001452  001424                          STAI6
                                        ;
                                        ;TEST MAINTENANCE REGISTER
                                        ;
001454  000005                  STAI7:  RESET                   ;CLEAR THE WORLD
001456  017767  177346  177404          MOV     @MA,WORK        ;FETCH MAINTENANCE REG
001464  001405                          BEQ     LPST7           ;MA CLEARED
                                        ERROR   \N
001466  012767  000007  177364  ERR7:   MOV     #7,ERCOUNT      ;SET UP ERROR COUNT 7
        000010                          N=N+1
001474  004567  006670                  JSR     %5,STAER        ;REPORT ERROR
001500  000004                  LPST7:  SCOPE                   ;ENTER SCOPE LOOP
001502  001454                          STAI7
                                        ;
                                        ;CAN WE SET THE FUNCTION BITS IN THE DCS REG.
                                        ;BITS 7,6,5,4,3,2&1
                                        ;
001504  012777  000176  177302  STAI10: MOV     #176,@DCS       ;SET DISK FUNCTION BITS
001512  017767  177276  177350          MOV     @DCS,WORK       ;FETCH FUNCTION BITS
```

```
001520  022767  000376  177342          CMP     #376,WORK       ;ARE THE FUNCTION BITS SET
001526  001410                          BEQ     LPST10          ;FUNCTION BITS SET
001530  012767  000376  177334          MOV     #376,WORK1      ;SET UP FOR ERROR REPORT
                                        ERROR   \N
001536  012767  000010  177314  ERR10:  MOV     #10,ERCOUNT     ;SET UP ERROR COUNT 10
        000011                          N=N+1
001544  004567  006672                  JSR     %5,STAER1       ;REPORT ERROR (ERROR IN FUNCTION BITS)
001550  000004                  LPST10: SCOPE                   ;ENTER SCOPE LOOP
001552  001504                          STA;10
```

```
                                ;
                                ;WILL DISK CLEAR CLEAR THE FUNCTION BITS
                                ;
001554  012777  000176  177232  STAI11: MOV     #176,@DCS       ;SET DISK FUNCTION BITS
001562  052777  000400  177224          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
001570  017767  177220  177272          MOV     @DCS,WORK       ;FETCH CONTROL REG
001576  022767  000200  177264          CMP     #200,WORK       ;IS ONLY READY SET
001604  001405                          BEQ     LPST11          ;REGISTER CLEARED
                                        ERROR   \N
001606  012767  000011  177244  ERR11:  MOV     #11,ERCOUNT     ;SET UP ERROR COUNT 11
        000012                          N=N+1
001614  004567  006550                  JSR     %5,STAER        ;REPORT ERROR
001620  000004                  LPST11: SCOPE                   ;ENTER SCOPE LOOP
001622  001554                          STAI11
                                ;
                                ;CAN WE SET ALL THE CMA BITS
                                ;
001624  012767  177777  177240  STAI12: MOV     #177777,WORK1   ;SET UP CURRENT ADDR. OF ALL ONES
001632  016777  177234  177160          MOV     WORK1,@CMA      ;LOAD CMA
001640  017767  177154  177222          MOV     @CMA,WORK       ;FETCH CMA
001646  026767  177220  177214          CMP     WORK1,WORK      ;COMPARE FOR ALL BITS SET
001654  001405                          BEQ     LPST12          ;ALL BITS SET?
                                        ERROR   \N
001656  012767  000012  177174  ERR12:  MOV     #12,ERCOUNT     ;SET UP ERROR COUNT 12
        000013                          N=N+1
001664  004567  006552                  JSR     %5,STAER1       ;REPORT ERROR
001670  000004                  LPST12: SCOPE                   ;ENTER SCOPE LOOP
001672  001624                          STAI12
                                ;
                                ;WILL DISK CLEAR - CLEAR THE CMA REGISTER
                                ;
001674  012777  177777  177116  STAI13: MOV     #177777,@CMA    ;SET CMA EQUAL TO ALL ONES
001702  052777  000400  177104          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
001710  005777  177104                  TST     @CMA            ;TEST FOR BIT0 SET IN CMA (READ ONLY BIT)
001714  001410                          BEQ     LPST13          ;WAS THE REST OF CMA CLEARED?
001716  017767  177072  177144          MOV     @DCS,WORK       ;NO! FETCH CMA REG.
                                        ERROR   \N
001724  012767  000013  177126  ERR13:  MOV     #13,ERCOUNT     ;SET UP ERROR COUNT 13
        000014                          N=N+1
001732  004567  006432                  JSR     %5,STAER        ;REPORT ERROR
001736  000004                  LPST13: SCOPE                   ;ENTER SCOPE LOOP
001740  001674                          STAI13
                                ;
                                ;CAN WE SET ALL BITS IN WC REGISTER
                                ;
001742  012767  177777  177122  STAI14: MOV     #177777,WORK1   ;SET UP MAX. WORD COUNT
001750  016777  177116  177040          MOV     WORK1,@WC       ;LOAD WC REGISTER
001756  026777  177110  177032          CMP     WORK1,@WC       ;ARE ALL BITS SET
001764  001410                          BEQ     LPST14          ;YES! EXIT
001766  017767  177024  177074          MOV     @WC,WORK        ;NO! FETCH WC REG.
                                        ERROR   \N
001774  012767  000014  177056  ERR14:  MOV     #14,ERCOUNT     ;SET UP ERROR COUNT 14
        000015                          N=N+1
002002  004567  006434                  JSR     %5,STAER1       ;REPORT ERROR
```

```
002006  000004                LPST14: SCOPE                   ;ENTER SCOPE LOOP
002010  001742                        STAI14
```

```
                                        ;
                                        ;WILL DISK CLEAR-CLEAR THE WORD COUNT REGISTER
                                        ;
002012  012777  177777  176776  STAI15: MOV     #177777,@WC     ;SET WC REGISTER EQUAL TO ALL ONES
002020  052777  000400  176766          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
002026  017767  176764  177034          MOV     @WC,WORK        ;FETCH WORD COUNT REGISTER
002034  001405                          BEQ     LPST15          ;YES! EXIT
                                        ERROR   \N
002036  012767  000015  177014  ERR15:  MOV     #15,ERCOUNT     ;SET UP ERROR COUNT 15
        000016                          N=N+1
002044  004567  006320                  JSR     %5,STAER        ;REPORT ERROR
002050  000004                  LPST15: SCOPE                   ;ENTER SCOPE LOOP
002052  002012                          STAI15
                                        ;
                                        ;CAN WE SET ALL THE BITS IN THE DAR REGISTER.
                                        ;
002054  012767  177777  177010  STAI16: MOV     #177777,WORK1
002062  016777  177004  176732          MOV     WORK1,@DAR      ;SET DAR TO ALL ONES
002070  017767  176726  176772          MOV     @DAR,WORK       ;FETCH DAR REGISTER
002076  026767  176770  176764          CMP     WORK1,WORK      ;ARE ALL BITS SET
002104  001405                          BEQ     LPST16          ;YES! EXIT
                                        ERROR   \N
002106  012767  000016  176744  ERR16:  MOV     #16,ERCOUNT     ;SET UP ERROR COUNT 16
        000017                          N=N+1
002114  004567  006322                  JSR     %5,STAER1       ;NOT ALL BITS SET REPORT ERROR
002120  000004                  LPST16: SCOPE                   ;ENTER SCOPE LOOP
002122  002054                          STAI16
                                        ;
                                        ;CAN WE CLEAR THE DAR REG, WITH DISK CLEAR.
                                        ;
002124  012777  177777  176670  STAI17: MOV     #177777,@DAR    ;SET DAR TO ALL ONES
002132  052777  000400  176654          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
002140  005777  176656                  TST     @DAR            ;TEST FOR ZERO DAR
002144  001410                          BEQ     LPST17          ;YES EXIT
002146  017767  176650  176714          MOV     @DAR,WORK       ;NO BITS SET IN DAR
                                        ERROR   \N
002154  012767  000017  176676  ERR17:  MOV     #17,ERCOUNT     ;SET UP ERROR COUNT 17
        000020                          N=N+1
002162  004567  006202                  JSR     %5,STAER        ;REPORT ERROR
002166  000004                  LPST17: SCOPE                   ;ENTER SCOPE LOOP
002170  002124                          STAI17
                                        ;
                                        ;CAN WE SET THE EXT. ADDRESS BITS IN THE DAE REGISTER
                                        ;
002172  012767  000037  176672  STAI20: MOV     #37,WORK1       ;
002200  016777  176666  176616          MOV     WORK1,@DAE      ;SET EXT. ADDRESS BITS
002206  017767  176612  176654          MOV     @DAE,WORK       ;FETCH CONTENTS OF DAE REG.
002214  026767  176652  176646          CMP     WORK1,WORK      ;ARE ALL EXT. ADDRESS BITS SET
002222  001405                          BEQ     LPST20          ;YES! EXIT
                                        ERROR   \N
002224  012767  000020  176626  ERR20:  MOV     #20,ERCOUNT     ;SET UP ERROR COUNT 20
        000021                          N=N+1
002232  004567  006204                  JSR     %5,STAER1       ;REPORT ERROR
002236  000004                  LPST20: SCOPE                   ;ENTER SCOPE LOOP
```

002240 002172 STAI20

```
                                        ;
                                        ;CAN WE CLEAR THE EXT ADDRESS BITS IN THE DAE REG,
                                        ;USING DISK CLEAR
                                        ;
002242  012777  000037  176554  STAI21: MOV     #37,@DAE        ;SET EXT. ADDRESS BITS
002250  052777  000400  176536          BIS     #BIT8,@DCS      ;EXECUTE DISK CLEAR
002256  017767  176542  176604          MOV     @DAE,WORK       ;FETCH CONTENTS OF DAE REG
002264  001405                          BEQ     LPST21          ;YES! EXIT
                                        ERROR   \N
002266  012767  000021  176564  ERR21:  MOV     #21,ERCOUNT     ;SET UP ERROR COUNT 21
        000022                          N=N+1

002274  004567  006070                  JSR     %5,STAER        ;REPORT ERROR
002300  000004                  LPST21: SCOPE                   ;ENTER SCOPE LOOP
002302  002242                          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
                                        ;
                                        ;
                                        ;* * * EXECUTE THE ONE WORD WRITE* * *
002304  052777  000400  176502  STAI22: BIS     #BIT8,@DCS      ;CLEAR THE DISK WORLD
002312  012767  177777  006570          MOV     #177777,OUTBUF  ;DATA TO BE X-FERED
002320  012777  011110  176472          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
002326  012777  177777  176462          MOV     #-1,@WC         ;SET WORD COUNT TO -1
002334  052777  000003  176452          BIS     #3,@DCS         ;GO WRITE
002342  105777  176446                  TSTB    @DCS            ;TEST FOR RDY=0
002346  100011                          BPL     STAI23          ;RDY=0
002350  017767  176440  176512          MOV     @DCS,WORK       ;BUSY NOT SET! FETCH DCS
                                EROR1:  ERROR   \N
002356  012767  000022  176474  ERR22:  MOV     #22,ERCOUNT     ;SET UP ERROR COUNT 22
        000023                          N=N+1
002364  004567  006000                  JSR     %5,STAER        ;REPORT ERROR
002370  000745                          BR      STAI22          ;RESTART TEST
002372  005067  176472          STAI23: CLR     WORK
002376  005267  176466          INCWAT: INC     WORK            ;WAIT FOR BUSY=0
002402  105777  176406                  TSTB    @DCS            ;IS BUSY CLEARED
002406  100417                          BMI     STAI24          ;FLAG CLEARED
002410  005767  176454                  TST     WORK            ;HAVE WE WAITED LONG ENOUGH
002414  001370                          BNE     INCWAT          ;RDY FAILED TO SET
002416  017767  176372  176444          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
002424  052767  000002  176440          BIS     #2,WORK1        ;WANT DCS SHOULD CONTAIN
                                EROR2:  ERROR   \N
002432  012767  000023  176420  ERR23:  MOV     #23,ERCOUNT     ;SET UP ERROR COUNT 23
        000024                          N=N+1
002440  004567  005776                  JSR     %5,STAER1       ;REPORT ERROR
002444  000717                          BR      STAI22          ;RESTART TEST
002446  017767  176342  176414  STAI24: MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
002454  005767  176410                  TST     WORK            ;IS ERROR FLAG SET
002460  100012                          BPL     STAI25          ;NO! X-FER OK
002462  012767  000202  176402          MOV     #202,WORK1      ;WHAT DCS SHOULD CONTAIN
                                EROR3:  ERROR   \N
002470  012767  000024  176362  ERR24:  MOV     #24,ERCOUNT     ;SET UP ERROR COUNT 24
        000025                          N=N+1
002476  004567  005740                  JSR     %5,STAER1       ;REPORT ERROR
002502  000167  177576                  JMP     STAI22          ;RESTART TEST
002506  017767  176312  176354  STAI25: MOV     @DAE,WORK       ;IS EXT. ADDRESS CLEAR
002514  001407                          BEQ     STAI26          ;DAE OK
                                EROR4:  ERROR   \N
002516  012767  000025  176334  ERR25:  MOV     #25,ERCOUNT     ;SET UP ERROR COUNT 25
        000026                          N=N+1
002524  004567  005640                  JSR     %5,STAER        ;REPORT ERROR
002530  000167  177550                  JMP     STAI22          ;RESTART TEST
```

```
002534  017767  176262  176326  STA126: MOV     @DAR,WORK       ;WAS DAR INCREMENTED BY 1
002542  022767  000001  176320          CMP     #BIT0,WORK      ;IS DAR CORRECT
002550  001412                          BEQ     STA127          ;DAR OK
002552  012767  000001  176312          MOV     #BIT0,WORK1     ;WHAT DAR SHOULD CONTAIN
                              ERROR5:   ERROR   \N
002560  012767  000026  176272  ERR26:  MOV     #26,ERCOUNT     ;SET UP ERROR COUNT 26
        000027                          N=N+1
002566  004567  005650                  JSR     %5,STAER1       ;REPORT ERROR
002572  000167  177506                  JMP     STA122          ;RESTART TEST
```

```
002576  017767  176214  176264  STAI27: MOV     @WC,WORK        ;FETCH WORD COUNT
002604  001407                          BEQ     STAI30          ;WORD COUNT DID OVERFLOW
                                EROR6:  ERROR   \N
002606  012767  000027  176244  ERR27:  MOV     #27,ERCOUNT     ;SET UP ERROR COUNT 27
        000030                          N=N+1
002614  004567  005550                  JSR     %5,STAER        ;WORD COUNT FAILED TO OVERFLOW
002620  000167  177460                  JMP     STAI22          ;RESTART TEST
002624  017767  176170  176236  STAI30: MOV     @CMA,WORK       ;FETCH CURRENT ADDRESS
002632  012767  011112  176232          MOV     #OUTBUF+2,WORK1 ;WHAT CMA SHOULD EQUAL
002640  026767  176226  176222          CMP     WORK1,WORK      ;IS CMA CORRECT
002646  001407                          BEQ     STAI31          ;YES EXECUTE CONTINUE
                                EROR7:  ERROR   \N
002650  012767  000030  176202  ERR30:  MOV     #30,ERCOUNT     ;SET UP ERROR COUNT 30
        000031                          N=N+1
002656  004567  005560                  JSR     %5,STAER1       ;REPORT ERROR IN CMA
002662  000167  177416                  JMP     STAI22          ;ERROR RESTART TEST
```

```
                                ;TAPE 2
                                ;       TEST WRITE
                                ;A WRITE CONTINUE WILL BE EXECUTED NOW
                                ;WORD COUNT WILL BE SET TO -1 AGAIN
                                ;
                                ;EROR10=BUSY NOT SET BY GO
                                ;EROR11=BUSY NOT CLEARED BY OVERFLOW
                                ;EROR12=DISK ERROR OCCURED WHILE X-FERING
                                ;EROR13=DAE INCREMENTED WHEN CONTINUE WAS EXECUTED
                                ;EROR14=DAR DID NOT EQUAL 2 AFTER SECOND X-FER
                                ;EROR15=WC DID NOT OVERFLOW AT THE END OF X-FER
                                ;EROR16=CMA DID NOT EQUAL OUTBUF+2 AT END OF X-FER
                                ;
                                ;
002666  012777  177777  176122  STAI31: MOV     #177777,@WC     ;SET WC TO -1
002674  052777  000001  176112           BIS     #BIT0,@DCS      ;SET GO TO CONTINUE
002702  105777  176106                   TSTB    @DCS            ;TEST FOR RDY SET
002706  100012                           BPL     STAI32          ;BUSY WAS SET BY GO
002710  017767  176100  176152           MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                EROR10: ERROR   \N
002716  012767  000031  176134  ERR31:  MOV     #31,ERCOUNT     ;SET UP ERROR COUNT 31
        000032                           N=N+1
002724  004567  005440                   JSR     %5,STAER        ;REPORT BUSY NOT SET
002730  000167  177350                   JMP     STAI22
002734  005067  176130           STAI32: CLR     WORK
002740  105777  176050           INCBUSY:TSTB    @DCS            ;TST FOR RDY SET BY OVERFLO
002744  100415                           BMI     STAI33          ;READY SET CONTINUE
002746  005267  176116                   INC     WORK            ;WAIT FOR RDY=1
002752  001372                           BNE     INCBUSY         ;GO WAIT FOR RDY
002754  017767  176034  176106           MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                EROR11: ERROR   \N
002762  012767  000032  176070  ERR32:  MOV     #32,ERCOUNT     ;SET UP ERROR COUNT 32
        000033                           N=N+1
002770  004567  005374                   JSR     %5,STAER        ;REPORT BUSY NOT CLEARED
002774  000167  177304                   JMP     STAI22          ;RESTART ROUTINE
003000  005777  176010           STAI33: TST     @DCS            ;DID AN ERROR OCCUR WHILE X-FERING
003004  100015                           BPL     STAI34          ;NO CONTINUE
003006  017767  176002  176054           MOV     @DCS,WORK       ;YES! CONTENTS OF DCS
003014  017767  176004  176050           MOV     @DAE,WORK1      ;EXT ERROR BITS
                                EROR12: ERROR   \N
003022  012767  000033  176030  ERR33:  MOV     #33,ERCOUNT     ;SET UP ERROR COUNT 33
        000034                           N=N+1
003030  004567  005406                   JSR     %5,STAER1       ;REPORT ERROR OCCURRED.
003034  000167  177244                   JMP     STAI22          ;RESTART ROUTINE
003040  005777  175760           STAI34: TST     @DAE            ;DID DAE INC. BY DATA WAS X-FERRED
003044  001412                           BEQ     STAI35          ;OK IT DID NOT INC
003046  017767  175752  176014           MOV     @DAE,WORK       ;ERROR IT INCREMENTED
                                EROR13: ERROR   \N
003054  012767  000034  175776  ERR34:  MOV     #34,ERCOUNT     ;SET UP ERROR COUNT 34
        000035                           N=N+1
003062  004567  005302                   JSR     %5,STAER        ;REPORT DAE INCREMENTED
003066  000167  177212                   JMP     STAI22
003072  017767  175724  175770  STAI35: MOV     @DAR,WORK       ;DID DAR INCREMENT ON CONTINUE
003100  012767  000002  175764           MOV     #2,WORK1        ;WHAT DAR SHOULD CONTAIN
```

```
003106  026767  175760  175754          CMP     WORK1,WORK      ;IS DAR CORRECT
003114  001407                          BEQ     STAI36          ;DAR OK
                              EROR14:   ERROR   \N
003116  012767  000035  175734  ERR35:  MOV     #35,ERCOUNT     ;SET UP ERROR COUNT 35
        000036                          N=N+1
003124  004567  005312                  JSR     %5,STAER1       ;REPORT DAR INCORRECT
003130  000167  177150                  JMP     STAI22          ;RE-START ROUTINE
003134  017767  175656  175726  STAI36: MOV     @WC,WORK        ;FETCH WORD COUNT
003142  001407                          BEQ     STAI37          ;WORD COUNT OVERFLOWED
                              EROR15:   ERROR   \N
003144  012767  000036  175706  ERR36:  MOV     #36,ERCOUNT     ;SET UP ERROR COUNT 36
        000037                          N=N+1
003152  004567  005212                  JSR     %5,STAER        ;REPORT WORD COUNT FAILED TO CLEAR
003156  000167  177122                  JMP     STAI22          ;RESTART ROUTINE
003162  017767  175632  175700  STAI37: MOV     @CMA,WORK       ;FETCH CMA
003170  012767  011114  175674          MOV     #OUTBUF+4,WORK1 ;WHAT CMA SHOULD EQUAL
003176  026767  175670  175664          CMP     WORK1,WORK      ;IS CMA CORRECT
003204  001407                          BEQ     LPST22          ;CMA WAS CORRECT
                              EROR16:   ERROR   \N
003206  012767  000037  175644  ERR37:  MOV     #37,ERCOUNT     ;SET UP ERROR COUNT 37
        000040                          N=N+1
003214  004567  005222                  JSR     %5,STAER1       ;REPORT CMA INCORRECT
003220  000167  177060                  JMP     STAI22          ;RESTART ROUTINE
003224  000004                LPST22:   SCOPE                   ;ENTER SCOPE LOOP
003226  002304                          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
                                ;
                                ;
                                ;* * *EXECUTE THE ONE WORD WRITE CHECK* * *
003230  052777  000400  175556  STAI40: BIS     #BIT8,@DCS      ;CLEAR THE DISK WORLD
003236  012767  177777  005644          MOV     #177777,OUTBUF  ;DATA TO BE X-FERED
003244  012777  011110  175546          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
003252  012777  177777  175536          MOV     #-1,@WC         ;SET WORD COUNT TO -1
003260  052777  000007  175526          BIS     #7,@DCS         ;GO WRITE CHECK
003266  105777  175522                  TSTB    @DCS            ;TEST FOR READY
003272  100011                          BPL     STAI41          ;NOT READY
003274  017767  175514  175566          MOV     @DCS,WORK       ;SET! FETCH DCS
                                EROR17: ERROR   \N
003302  012767  000040  175550  ERR40:  MOV     #40,ERCOUNT     ;SET UP ERROR COUNT 40
        000041                          N=N+1
003310  004567  005054                  JSR     %5,STAER        ;REPORT ERROR
003314  000745                          BR      STAI40          ;RESTART TEST
003316  005067  175546          STAI41: CLR     WORK
003322  005267  175542          WCWAT:  INC     WORK            ;WAIT FOR READY
003326  105777  175462                  TSTB    @DCS
003332  100417                          BMI     STAI42          ;FLAG SET
003334  005767  175530                  TST     WORK            ;HAVE WE WAITED LONG ENOUGH
003340  001370                          BNE     WCWAT           ;READY FAILED TO SET
003342  017767  175446  175520          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
003350  052767  000006  175514          BIS     #6,WORK1        ;WANT DCS SHOULD CONTAIN
                                EROR20: ERROR   \N
003356  012767  000041  175474  ERR41:  MOV     #41,ERCOUNT     ;SET UP ERROR COUNT 41
        000042                          N=N+1
003364  004567  005052                  JSR     %5,STAER1       ;REPORT ERROR
003370  000717                          BR      STAI40          ;RESTART TEST
003372  017767  175416  175470  STAI42: MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
003400  100021                          BPL     STAI43          ;NO! X-FER OK
003402  026727  175462  120006          CMP     WORK,#120006    ;DID WCE OCCUR
003410  001002                          BNE     .+6             ;
003412  012767  120000  175452          MOV     #120000,WORK1   ;YES WCE OCCURRED
003420  052767  000006  175444          BIS     #6,WORK1        ;WHAT DCS SHOULD CONTAIN
                                EROR21: ERROR   \N
003426  012767  000042  175424  ERR42:  MOV     #42,ERCOUNT     ;SET UP ERROR COUNT 42
        000043                          N=N+1
003434  004567  005002                  JSR     %5,STAER1       ;REPORT ERROR
003440  000167  177564                  JMP     STAI40          ;RESTART TEST
003444  017767  175354  175416  STAI43: MOV     @DAE,WORK       ;IS EXT. ADDRESS CLEAR
003452  001407                          BEQ     STAI44          ;DAE OK
                                EROR22: ERROR   \N
```

```
003454  012767  000043  175376  ERR43:  MOV     #43,ERCOUNT     ;SET UP ERROR COUNT 43
        000044                          N=N+1
003462  004567  004702                  JSR     %5,STAER        ;REPORT ERROR
003466  000167  177536                  JMP     STAI40          ;RESTART TEST
003472  017767  175324  175370  STAI44: MOV     @DAR,WORK       ;WAS DAR INCREMENTED BY 1
003500  022767  000001  175362          CMP     #BIT0,WORK      ;IS DAR CORRECT
003506  001412                          BEQ     STAI45          ;DAR OK
003510  012767  000001  175354          MOV     #BIT0,WORK1     ;WHAT DAR SHOULD CONTAIN
                                EROR23: ERROR   \N
003516  012767  000044  175334  ERR44:  MOV     #44,ERCOUNT     ;SET UP ERROR COUNT 44
        000045                          N=N+1
003524  004567  004712                  JSR     %5,STAER1       ;REPORT ERROR
003530  000167  177474                  JMP     STAI40          ;RESTART TEST
003534  017767  175256  175326  STAI45: MOV     @WC,WORK        ;FETCH WORD COUNT
003542  001407                          BEQ     STAI46          ;WORD COUNT DID OVERFLOW
                                EROR24: ERROR   \N
003544  012767  000045  175306  ERR45:  MOV     #45,ERCOUNT     ;SET UP ERROR COUNT 45
        000046                          N=N+1
003552  004567  004612                  JSR     %5,STAER        ;WORD COUNT FAILED TO OVERFLOW
003556  000167  177446                  JMP     STAI40          ;RESTART TEST
003562  017767  175232  175300  STAI46: MOV     @CMA,WORK       ;FETCH CURRENT ADDRESS
003570  012767  011112  175274          MOV     #OUTBUF+2,WORK1 ;WHAT CMA SHOULD EQUAL
003576  026767  175270  175264          CMP     WORK1,WORK      ;IS CMA CORRECT
003604  001407                          BEQ     STAI47          ;YES EXECUTE CONTINUE
                                EROR25: ERROR   \N
003606  012767  000046  175244  ERR46:  MOV     #46,ERCOUNT     ;SET UP ERROR COUNT 46
        000047                          N=N+1
003614  004567  004622                  JSR     %5,STAER1       ;REPORT ERROR IN CMA
003620  000167  177404                  JMP     STAI40          ;ERROR RESTART TEST
```

```
                                ;
                                ;A WRITE CHECK CONTINUE CONTINUE WILL BE EXECUTED NOW
                                ;WORD COUNT WILL BE SET TO -1 AGAIN
                                ;
                                ;EROR26=BUSY WAS NOT SET BY GO
                                ;EROR27=BUSY NOT CLEARED BY OVERFLOW
                                ;EROR30=DISK ERROR OCCURRED WHILE X-FERING
                                ;EROR31=DAE INCREMENTED WHEN CONTINUE WAS EXECUTED
                                ;EROR32=DAR DID NOT EQUAL 2 AFTER SECOND X-FER
                                ;EROR33=WC DID NOT=0 AFTER X-FER
                                ;EROR34=CMA DID NOT=OUTBUF+2 AT END OF X-FER
                                ;
                                ;
003624  012777  177777  175164  STAI47: MOV     #177777,@WC     ;SET WC TO -1
003632  052777  000001  175154          BIS     #BIT0,@DCS      ;SET GO TO CONTINUE
003640  105777  175150                  TSTB    @DCS            ;TEST FOR READY
003644  100012                          BPL     STAI50          ;
003646  017767  175142  175214          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                EROR26: ERROR   \N
003654  012767  000047  175176  ERR47:  MOV     #47,ERCOUNT     ;SET UP ERROR COUNT 47
        000050                          N=N+1
003662  004567  004502                  JSR     %5,STAER        ;REPORT BUSY NOT SET
003666  000167  177336                  JMP     STAI40
003672  005067  175172          STAI50: CLR     WORK
003676  105777  175112          WCBUSI: TSTB    @DCS            ;TST FOR RDY SET BY OVERFLOW
003702  100415                          BMI     STAI51          ;BRANCH IF READY SET
003704  005267  175160                  INC     WORK            ;WAIT FOR BUSY=0
003710  001372                          BNE     WCBUSI          ;GO WAIT FOR RDY
003712  017767  175076  175150          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                EROR27: ERROR   \N
003720  012767  000050  175132  ERR50:  MOV     #50,ERCOUNT     ;SET UP ERROR COUNT 50
        000051                          N=N+1
003726  004567  004436                  JSR     %5,STAER        ;REPORT RDY NOT SET
003732  000167  177272                  JMP     STAI40          ;RESTART ROUTINE
003736  005777  175052          STAI51: TST     @DCS            ;DID AN ERROR OCCUR WHILE X-FERING
003742  100024                          BPL     STAI52          ;NO CONTINUE
003744  017767  175044  175116          MOV     @DCS,WORK       ;YES! CONTENTS OF DCS
003752  026727  175112  120006          CMP     WORK,#120006
003760  001002                          BNE     .+6
003762  012767  120000  175102          MOV     #120000,WORK1
003770  052767  000006  175074          BIS     #6,WORK1        ;EXT ERROR BITS
                                EROR30: ERROR   \N
003776  012767  000051  175054  ERR51:  MOV     #51,ERCOUNT     ;SET UP ERROR COUNT 51
        000052                          N=N+1
004004  004567  004432                  JSR     %5,STAER1       ;REPORT ERROR OCCURRED
004010  000167  177214                  JMP     STAI40          ;RESTART ROUTINE
004014  005777  175004          STAI52: TST     @DAE            ;DID DAE INC. BY DATA WAS X-FERED
004020  001412                          BEQ     STAI53          ;OK IT DID NOT INC
004022  017767  174776  175040          MOV     @DAE,WORK       ;ERROR IT INCREMENTED
                                EROR31: ERROR   \N
004030  012767  000052  175022  ERR52:  MOV     #52,ERCOUNT     ;SET UP ERROR COUNT 52
        000053                          N=N+1
004036  004567  004326                  JSR     %5,STAER        ;REPORT DAE INCREMENTED
004042  000167  177162                  JMP     STAI40
```

```
004046  017767  174750  175014  STAI53: MOV     @DAR,WORK       ;DID DAR INCREMENT ON CONTINUE
004054  012767  000002  175010          MOV     #2,WORK1        ;WHAT DAR SHOULD CONTAIN
004062  026767  175004  175000          CMP     WORK1,WORK      ;IS DAR CORRECT
004070  001407                          BEQ     STAI54          ;DAR OK
                                EROR32: ERROR   \N
004072  012767  000053  174760  ERR53:  MOV     #53,ERCOUNT     ;SET UP ERROR COUNT 53
        000054                          N=N+1
004100  004567  004336                  JSR     %5,STAER1       ;REPORT DAR INCORRECT
004104  000167  177120                  JMP     STAI40          ;RE-START ROUTINE
004110  017767  174702  174752  STAI54: MOV     @WC,WORK        ;FETCH WORD COUNT
004116  001407                          BEQ     STAI55          ;WORD COUNT OVERFLOWED
                                EROR33: ERROR   \N
004120  012767  000054  174732  ERR54:  MOV     #54,ERCOUNT     ;SET UP ERROR COUNT 54
        000055                          N=N+1
004126  004567  004236                  JSR     %5,STAER        ;REPORT WORD COUNT FAILED TO CLEAR
004132  000167  177072                  JMP     STAI40          ;RESTART ROUTINE
004136  017767  174656  174724  STAI55: MOV     @CMA,WORK       ;FETCH CMA
004144  012767  011114  174720          MOV     #OUTBUF+4,WORK1 ;WHAT CMA CHOULD EQUAL
004152  026767  174714  174710          CMP     WORK1,WORK      ;IS CMA CORRECT
004160  001407                          BEQ     LPST40          ;CMA WAS CORRECT
                                EROR34: ERROR   \N
004162  012767  000055  174670  ERR55:  MOV     #55,ERCOUNT     ;SET UP ERROR COUNT 55
        000056                          N=N+1
004170  004567  004246                  JSR     %5,STAER1       ;REPORT CMA INCORRECT
004174  000167  177030                  JMP     STAI40          ;RESTART ROUTINE
004200  000004                  LPST40: SCOPE                   ;ENTER SCOPE LOOP
004202  003230                          STAI40
```

```
                                ;       TEST READ
                                ;ONE WORD READ FOLLOWED BY A ONE WORD
                                ;READ CONTINUE.
                                ;
                                ;EROR35=BUSY WAS NOT SET BY GO
                                ;EROR36=BUSY NOT CLEARED BY OVERFLOW
                                ;EROR37=DISK ERROR OCCURRED WHILE X-FERING DATA
                                ;EROR40=DAE INCREMENTED WHEN X-FERING DATA
                                ;EROR41=DAR FAILED TO INCREMENT WHEN X-FERING DATA
                                ;EROR42=WORD COUNT FAILED TO OVERFLOW
                                ;EROR43=CMA FAILED TO INCREMENT
                                ;
                                ;
                                ;* * *EXECUTE THE ONE WORD READ* * *
004204  052777  000400  174602  STAI56: BIS     #BIT8,@DCS      ;CLEAR THE DISK WORLD
004212  012767  177777  004670          MOV     #177777,OUTBUF  ;DATA TO BE X-FERED
004220  012777  011110  174572          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
004226  012777  177777  174562          MOV     #-1,@WC         ;SET WORD COUNT TO -1
004234  052777  000005  174552          BIS     #5,@DCS         ;GO READ
004242  105777  174546                  TSTB    @DCS            ;TEST FOR BUSY=1
004246  100011                          BPL     STAI57          ;BUSY SET
004250  017767  174540  174612          MOV     @DCS,WORK       ;BUSY NOT SET! FETCH DCS
                                EROR35: ERROR   \N
004256  012767  000056  174574  ERR56:  MOV     #56,ERCOUNT     ;SET UP ERROR COUNT 56
        000057                          N=N+1
004264  004567  004100                  JSR     %5,STAER        ;REPORT ERROR
004270  000745                          BR      STAI56          ;RESTART TEST
004272  005067  174572          STAI57: CLR     WORK
004276  005267  174566          RDWAT:  INC     WORK            ;WAIT FOR BUSY=0
004302  105777  174526                  TSTB    @DCS            ;IS BUSY CLEARED
004306  100417                          BMI     STAI60          ;FLAG CLEARED
004310  005767  174554                  TST     WORK            ;HAVE WE WAITED LONG ENOUGH
004314  001370                          BNE     RDWAT           ;BUSY FAILED TO CLEAR
004316  017767  174472  174544          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
004324  052767  000005  174540          BIS     #5,WORK1        ;WANT DCS SHOULD CONTAIN
                                EROR36: ERROR   \N
004332  012767  000057  174520  ERR57:  MOV     #57,ERCOUNT     ;SET UP ERROR COUNT 57
        000060                          N=N+1
004340  004567  004076                  JSR     %5,STAER1       ;REPORT ERROR
004344  000717                          BR      STAI56          ;RESTART TEST
004346  017767  174442  174514  STAI60: MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS REG
004354  005767  174510                  TST     WORK            ;IS ERROR FLAG SET
004360  100012                          BPL     STAI61          ;NO! X-FER OK
004362  012767  000003  174502          MOV     #3,WORK1        ;WHAT DCS SHOULD CONTAIN
                                EROR37: ERROR   \N
004370  012767  000060  174462  ERR60:  MOV     #60,ERCOUNT     ;SET UP ERROR COUNT 60
        000061                          N=N+1
004376  004567  004040                  JSR     %5,STAER1       ;REPORT ERROR
004402  000167  177576                  JMP     STAI56          ;RESTART TEST
004406  017767  174412  174454  STAI61: MOV     @DAE,WORK       ;IS EXT. ADDRESS CLEAR
004414  005767  174450                  TST     WORK            ;DAE SHOULD NOT HAVE INC.
004420  001407                          BEQ     STAI62          ;DAE OK
                                EROR40: ERROR   \N
004422  012767  000061  174430  ERR61:  MOV     #61,ERCOUNT     ;SET UP ERROR COUNT 61
```

```
                000062                          N=N+1
004430  004567  003734                         JSR     %5,STAER        ;REPORT ERROR
004434  000167  177544                         JMP     STAI56          ;RESTART TEST
004440  017767  174356  174422  STAI62:        MOV     @DAR,WORK       ;WAS DAR INCREMENTED BY 1
004446  022767  000001  174414                 CMP     #BIT0,WORK      ;IS DAR CORRECT
004454  001412                                 BEQ     STAI63          ;DAR OK
004456  012767  000001  174406                 MOV     #BIT0,WORK1     ;WHAT DAR SHOULD CONTAIN
                                        EROR41: ERROR   \N
004464  012767  000062  174366  ERR62:         MOV     #62,ERCOUNT     ;SET UP ERROR COUNT 62
                000063                          N=N+1
004472  004567  003744                         JSR     %5,STAER1       ;REPORT ERROR
004476  000167  177502                         JMP     STAI56          ;RESTART TEST
004502  017767  174310  174360  STAI63:        MOV     @WC,WORK        ;FETCH WORD COUNT
004510  001407                                 BEQ     STAI64          ;WORD COUNT DID OVERFLOW
                                        EROR42: ERROR   \N
004512  012767  000063  174340  ERR63:         MOV     #63,ERCOUNT     ;SET UP ERROR COUNT 63
                000064                          N=N+1
004520  004567  003644                         JSR     %5,STAER        ;WORD COUNT FAILED TO OVERFLOW
004524  000167  177454                         JMP     STAI56          ;RESTART TEST
004530  017767  174264  174332  STAI64:        MOV     @CMA,WORK       ;FETCH CURRENT ADDRESS
004536  012767  011112  174326                 MOV     #OUTBUF+2,WORK1 ;WHAT CMA SHOULD EQUAL
004544  026767  174322  174316                 CMP     WORK1,WORK      ;IS CMA CORRECT
004552  001407                                 BEQ     STAI65          ;YES EXECUTE CONTINUE
                                        EROR43: ERROR   \N
004554  012767  000064  174276  ERR64:         MOV     #64,ERCOUNT     ;SET UP ERROR COUNT 64
                000065                          N=N+1
004562  004567  003654                         JSR     %5,STAER1       ;REPORT ERROR IN CMA
004566  000167  177412                         JMP     STAI56          ;ERROR RESTART TEST
```

```
                                ;A READ CONTINUE WILL BE EXECUTED NOW
                                ;WORD COUNT WILL BE SET TO -1 AGAIN
                                ;
                                ;EROR44=BUSY NOT SET BY GO
                                ;EBOR45=BUSY NOT CLEARED BY OVERFLOW
                                ;EROR46=DISK ERROR OCCURRED WHILE X-FERING
                                ;EROR47=DAE INCREMENTED WHEN CONTINUE WAS EXECUTED
                                ;EROR50=DAR DID NOT EQUAL 2 AFTER SECOND X-FER
                                ;EROR51=WC FAILED TO OVERFLOW ON READ CONTINUE
                                ;EROR52=CMA DID NOT EQUAL OUTBUF+2 AFTER READ CONTINUE
                                ;
                                ;
004572  012777  177777  174216  STAI65: MOV     #177777,@WC     ;SET WC TO -1
004600  052777  000001  174206          BIS     #BIT0,@DCS      ;SET GO TO CONTINUE
004606  105777  174202                  TSTB    @DCS            ;TEST FOR RDY=0
004612  100012                          BPL     STAI66          ;RDY SET
004614  017767  174174  174246          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                EROR44: ERROR   \N
004622  012767  000065  174230  ERR65:  MOV     #65,ERCOUNT     ;SET UP ERROR COUNT 65
        000066                          N=N+1
004630  004567  003534                  JSR     %5,STAER        ;REPORT BUSY NOT SET
004634  000167  177344                  JMP     STAI56
004640  005067  174224          STAI66: CLR     WORK
004644  105777  174144          INCRD:  TSTB    @DCS            ;TST FOR RDY SET BY OVERFLOW
004650  100415                          BMI     STAI67          ;RDY SET CONTINUE
004652  005267  174212                  INC     WORK            ;WAIT FOR BUSY=0
004656  001372                          BNE     INCRD           ;GO WAIT FOR BUSY
004660  017767  174130  174202          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                EROR45: ERROR   \N
004666  012767  000066  174164  ERR66:  MOV     #66,ERCOUNT     ;SET UP ERROR COUNT 66
        000067                          N=N+1
004674  004567  003470                  JSR     %5,STAER        ;REPORT BUSY NOT CLEARED
004700  000167  177300                  JMP     STAI56          ;RESTART ROUTINE
004704  005777  174104          STAI67: TST     @DCS            ;DID AN ERROR OCCUR WHILE X-FERING
004710  100015                          BPL     STAI70          ;NO CONTINUE
004712  017767  174076  174150          MOV     @DCS,WORK       ;YES! CONTENTS OF DCS
004720  017767  174100  174144          MOV     @DAE,WORK1      ;EXT ERROR BITS
                                EROR46: ERROR   \N
004726  012767  000067  174124  ERR67:  MOV     #67,ERCOUNT     ;SET UP ERROR COUNT 67
        000070                          N=N+1
004734  004567  003502                  JSR     %5,STAER1       ;REPORT ERROR OCCURRED
004740  000167  175340                  JMP     STAI22          ;RESTART ROUTINE
004744  005777  174054          STAI70: TST     @DAE            ;DID DAE INC. BY DATA WAS X-FERED
004750  001412                          BEQ     STAI71          ;OK IT DID NOT INC
004752  017767  174046  174110          MOV     @DAE,WORK       ;ERROR IT INCREMENTED
                                EROR47: ERROR   \N
004760  012767  000070  174072  ERR70:  MOV     #70,ERCOUNT     ;SET UP ERROR COUNT 70
        000071                          N=N+1
004766  004567  003376                  JSR     %5,STAER        ;REPORT DAE INCREMENTED
004772  000167  177206                  JMP     STAI56
004776  017767  174020  174064  STAI71: MOV     @DAR,WORK       ;DID DAR INCREMENT ON CONTINUE
005004  012767  000002  174060          MOV     #2,WORK1        ;WHAT DAR SHOULD CONTAIN
005012  026767  174054  174050          CMP     WORK1,WORK      ;IS DAR CORRECT
005020  001407                          BEQ     STAI72          ;DAR OK
```

```
                                    EROR50: ERROR   \N
005022  012767  000071  174030      ERR71:  MOV     #71,ERCOUNT     ;SET UP ERROR COUNT 71
        000072                              N=N+1
005030  004567  003406                      JSR     %5,STAER1       ;REPORT DAR INCORRECT
005034  000167  177144                      JMP     STAI56          ;RESTART ROUTINE
005040  017767  173752  174022      STAI72: MOV     @WC,WORK        ;FETCH WORD COUNT
005046  001407                      STAI72: BEQ     STAI73          ;WORD COUNT OVERFLOWED
                                    EROR51: ERROR   \N
005050  012767  000072  174002      ERR72:  MOV     #72,ERCOUNT     ;SET UP ERROR COUNT 72
        000073                              N=N+1
005056  004567  003306                      JSR     %5,STAER        ;REPORT WORD COUNT FAILED TO CLEAR
005062  000167  177116                      JMP     STAI56          ;RESTART ROUTINE
005066  017767  173726  173774      STAI73: MOV     @CMA,WORK       ;FETCH CMA
005074  012767  011114  173770              MOV     #OUTBUF+4,WORK1 ;WHAT CMA SHOULD EQUAL
005102  026767  173764  173760              CMP     WORK1,WORK      ;IS CMA CORRECT
005110  001407                              BEQ     LPST56          ;CMA WAS CORRECT
                                    EROR52: ERROR   \N
005112  012767  000073  173740      ERR73:  MOV     #73,ERCOUNT     ;SET UP ERROR COUNT 73
        000074                              N=N+1
005120  004567  003316                      JSR     %5,STAER1       ;REPORT CMA INCORRECT
005124  000167  177054                      JMP     STAI56          ;RESTART ROUTINE
005130  000004                      LPST56: SCOPE                   ;ENTER SCOPE LOOP
005132  004204                              STAI56
```

```
                                ;
                                ;IN THIS STATIC TEST THE ABILITY OF THE DISK CONTROL
                                ;TO INCREMENT THE TRACK REGIST 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
                                ;
005134  052777  000400  173652  STAI74: BIS     #BIT8,@DCS      ;CLEAR THE DISK
005142  012777  177777  173646          MOV     #177777,@WC     ;SET WORD COUNT TO -1
005150  012777  011110  173642          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
005156  005077  173642                  CLR     @DAE            ;CLEAR EXT. ADDR BITS
005162  012777  177777  173632          MOV     #177777,@DAR    ;SET DAR TO ALL ONES
005170  012777  000003  173616          MOV     #3,@DCS         ;GO WRITE ONE WORD
005176  005067  173666                  CLR     WORK            ;LET'S WAIT FOR COMPLETION
005202  105777  173676          LTSWT:  TSTB    @DCS            ;TEST FOR NOT BUSY
005206  100414                  BMI     STAI75          ;X-FER COMPLETE
005210  005267  173654          INC     WORK            ;+1 WAIT REG.
005214  001372                  BNE     LTSWT           ;GO WAIT FOR NOT BUSY
005216  017767  173572  173644          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                ERROR   \N
005224  012767  000074  173626  ERR74:  MOV     #74,ERCOUNT     ;SET UP ERROR COUNT 74
        000075                  N=N+1
005232  004567  003132                  JSR     %5,STAER        ;REPORT ERROR X-FER NEVER COMPLETED
005236  000736                  BR      STAI74          ;RESTART ROUTINE
005240  005777  173556          STAI75: TST     @DAR            ;DOES DAR=0
005244  001412                  BEQ     STAI76          ;DAR OK
005246  017767  173550  173614          MOV     @DAR,WORK       ;FETCH DAR
                                ERROR   \N
005254  012767  000075  173576  ERR75:  MOV     #75,ERCOUNT     ;SET UP ERROR COUNT 75
        000076                  N=N+1
005262  004567  003102                  JSR     %5,STAER        ;REPORT DAR DID NOT INC TO 0
005266  000167  177642                  JMP     STAI74          ;ERROR RE-START ROUTINE
005272  017767  173526  173570  STAI76: MOV     @DAE,WORK       ;FETCH DAE
005300  042767  177774  173562          BIC     #177774,WORK    ;CLEAR DISK AND ERROR BITS
005306  022767  000001  173554          CMP     #1,WORK         ;DID DAE INC
005314  001410                  BEQ     LPST74          ;DAE SHOULD EQUAL 1
005316  012767  000001  173546          MOV     #1,WORK1        ;WHAT DAE SHOULD CONTAIN
                                ERROR   \N
005324  012767  000076  173526  ERR76:  MOV     #76,ERCOUNT     ;SET UP ERROR COUNT 76
        000077                  N=N+1
005332  004567  003104                  JSR     %5,STAER1       ;REPORT DAE NOT CORRECT
005336  000004          LPST74: SCOPE                   ;ENTER SCOPE LOOP
005340  005134                  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
                                        ;
                                        ;
005342  016767  173466  173522  STAI77: MOV     FLAG,WORK1      ;FETCH PROGRAM FLAG
005350  042767  177743  173514          BIC     #177743,WORK1   ;MASK DISK NO.
005356  052767  000003  173506          BIS     #3,WORK1        ;SET ADDR EXT. BITS
005364  016777  173502  173432          MOV     WORK1,@DAE      ;SET DAE REG
005372  012777  177777  173422          MOV     #177777,@DAR    ;DAR EQUALS ALL ONES
005400  012777  177777  173410          MOV     #177777,@WC     ;WORD COUNT SET FOR ONE WORD
005406  012777  011110  173404          MOV     #OUTBUF,@CMA    ;CURRENT ADDRESS SET UP
005414  052777  000003  173372          BIS     #3,@DCS         ;GO WRITE
005422  105777  173366                  TSTB    @DCS            ;IS RDY CLEARED
005426  100011                          BPL     STA100          ;
005430  017767  173360  173432          MOV     @DCS,WORK       ;FETCH CONTROL RUG
                                        ERROR   \N
005436  012767  000077  173414  ERR77:  MOV     #77,ERCOUNT     ;SET UP ERROR COUNT 77
        000100                          N=N+1
005444  004567  002720                  JSR     %5,STAER        ;REPORT BUSY NOT SET
005450  000734                          BR      STAI77          ;RESTART ROUTINE
005452  005067  173412          STA100: CLR     WORK
005456  105777  173332          INXDSK: TSTB    @DCS            ;IS X-FER COMPLETE
005462  100415                          BMI     STA101
005464  005267  173400                  INC     WORK            ;TEST READY SHOULD BE SET
005470  001372                          BNE     INXDSK          ;GO CHECK AGAIN
005472  017767  173316  173370          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                        ERROR   \N
005500  012767  000100  173352  ERR100: MOV     #100,ERCOUNT    ;SET UP ERROR COUNT 100
        000101                          N=N+1
005506  004567  002656                  JSR     %5,STAER        ;REPORT X-FER NOT COMPLETE
005512  000167  177624                  JMP     STAI77          ;RESTART ROUTINE
005516  005777  173300          STA101: TST     @DAR            ;IS DAR CLEARED
005522  001412                          BEQ     STA102          ;YES
005524  017767  173272  173336          MOV     @DAR,WORK       ;FETCH DAR ITS NOT CLEAR
                                        ERROR   \N
005532  012767  000101  173320  ERR101: MOV     #101,ERCOUNT    ;SET UP ERROR COUNT 101
        000102                          N=N+1
005540  004567  002624                  JSR     %5,STAER        ;REPORT DAR NOT CLEAR.
005544  000167  177572                  JMP     STAI77          ;RESTART ROUTINE
```

```
005550  005267  173316          STA102: INC     WORK1           ;DAE SHOULD=THIS AT END X-FER
005554  026777  173312  173242          CMP     WORK1,@DAE      ;IS DAE CORRECT
005562  001412                          BEQ     LPST77          ;DAE IS CORRECT
005564  017767  173234  173276          MOV     @DAE,WORK       ;FETCH CONTENTS OF DAE
                                        ERROR   \N
005572  012767  000102  173260  ERR102: MOV     #102,ERCOUNT    ;SET UP ERROR COUNT 102
        000103                          N=N+1
005600  004567  002636                  JSR     %5,STAER1       ;REPORT DAE INCORRECT
005604  000167  177532                  JMP     STAI77          ;RESTART ROUTINE
005610  000004                  LPST77: SCOPE                   ;ENTER SCOPE LOOP
005612  005342                          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
                                        ;
                                        ;
                                        ;
                                        ;
005614  052777  000400  173172  STA103: BIS     #BIT8,@DCS      ;CLEAR THE DISK
005622  012777  000037  173174         MOV     #37,@DAE        ;SET ALL EXT ADDR. BITS
005630  012777  177777  173164         MOV     #177777,@DAR    ;SET DAR=TO ALL ONES
005636  012777  177776  173152         MOV     #177776,@WC     ;WORD COUNT=-2
005644  012777  011110  173146         MOV     #OUTBUF,@CMA    ;CURRENT ADDRESS=OUTBUF
005652  052777  000003  173134         BIS     #3,@DCS         ;GO WRITE
005660  005067  173204                 CLR     WORK
005664  105777  173124         WAFBUS: TSTB    @DCS            ;IS RDY SET
005670  100414                 BMI     STA104          ;YES EXIT
005672  005267  173172                 INC     WORK            ;NO BUSY STILL SET
005676  001372                 BNE     WAFBUS          ;GO WAIT FOR BUSY=0
005700  017767  173110  173162         MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                        ERROR   \N
005706  012767  000103  173144  ERR103: MOV     #103,ERCOUNT    ;SET UP ERROR COUNT 103
        000104                          N=N+1
005714  004567  002450                 JSR     %5,STAER        ;REPORT BUSY SET
005720  000735                         BR      STA103          ;RESTART ROUTINE
005722  032777  004000  173064  STA104: BIT     #BIT11,@DCS     ;IS NCD SET
005730  001011                 BNE     STA105          ;YES! IS ERROR SET
005732  017767  173056  173130         MOV     @DCS,WORK       ;FETCH DCS
                                        ERROR   \N
005740  012767  000104  173112  ERR104: MOV     #104,ERCOUNT    ;SET UP ERROR COUNT 104
        000105                          N=N+1
005746  004567  002416                 JSR     %5,STAER        ;REPORT NEED NOT SET
005752  000720                         BR      STA103          ;RESTART ROUTINE
005754  005777  173034         STA105: TST     @DCS            ;IS ERROR FLAG SET
005760  100411                 BMI     LPSX103         ;ERROR IS SET
005762  017767  173026  173100         MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
                                        ERROR   \N
005770  012767  000105  173062  ERR105: MOV     #105,ERCOUNT    ;SET UP ERROR COUNT 105
        000106                          N=N+1
005776  004567  002366                 JSR     %5,STAER        ;REPORT ERROR NOT SET
006002  000704                         BR      STA103          ;RESTART ROUTINE
006004  000004                 LPSX103:SCOPE                   ;ENTER SCOPE LOOP
006006  005614                         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
                                ;
                                ;
006010  052777  000400  172776 ST105X: BIS     #BIT8,@DCS      ;CLEAR THE DISK
006016  012777  011110  172774         MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDR
006024  012777  177777  172764         MOV     #-1,@WC         ;SET WORD COUNT TO -1
006032  052777  000400  172764         BIS     #BIT8,@DAE      ;SET CURRENT ADDR, INHIBIT
006040  105777  172750                TSTB    @DCS            ;TEST FOR READY
006044  100406                       BMI     LPX105          ;BRANCH IF READY SET
                                      ERROR   \N
006046  012767  000106  173004 ERR106: MOV     #106,ERCOUNT    ;SET UP ERROR COUNT 106
        000107                        N=N+1
006054  004567  002310                JSR     %5,STAER        ;REPORT READY NOT SET
006060  000753                       BR      ST105X          ;TRY AGAIN
006062  012777  000003  172724 LPX105: MOV     #3,@DCS         ;GO WRITE
006072  105777  172720                TSTB    @DCS            ;TEST FOR NOT RDY
006074  100006                       BPL     LPX106          ;BRANCH IF RDY=0
                                      ERROR   \N
006076  012767  000107  172754 ERR107: MOV     #107,ERCOUNT    ;SET UP ERROR COUNT 107
        000110                        N=N+1
006104  004567  002260                JSR     %5,STAER        ;REPORT RDY NOT CLEARED BY CMD.
006110  000737                       BR      ST105X          ;LOOP ON ERROR
006112  005067  172752         LPX106: CLR     WORK
006116  105777  172672         WATRDY: TSTB    @DCS
006122  100411                       BMI     LPX107          ;BRANCH IF RDY SET
006124  005267  172740                INC     WORK            ;WAIT FOR RDY
006130  001372                       BNE     WATRDY
                                      ERROR   \N
006132  012767  000110  172720 ERR110: MOV     #110,ERCOUNT    ;SET UP ERROR COUNT 110
        000111                        N=N+1
006140  004567  002224                JSR     %5,STAER        ;READY NEVER SET AFTER X-FER
006144  000721                       BR      ST105X          ;LOOP ON ERROR
006146  012767  011110  172716 LPX107: MOV     #OUTBUF,WORK1   ;WHAT CMA SHOULD BE
006154  017767  172640  172706         MOV     @CMA,WORK       ;WHAT CMA IS
006162  026767  172702  172702         CMP     WORK,WORK1      ;COMPARE
006170  001406                       BEQ     LPX108          ;BRANCH IF EQUAL
                                      ERROR   \N
006172  012767  000111  172660 ERR111: MOV     #111,ERCOUNT    ;SET UP ERROR COUNT 111
        000112                        N=N+1
006200  004567  002236                JSR     %5,STAER1       ;REPORT THEY DID NOT CMP
006204  000701                       BR      ST105X          ;LOOP ON ERROR
006206  000004         LPX108: SCOPE                          ;ENTER SCOPE LOOP
006210  006010                       ST105X
```

```
                                ;
                                ;IN THIS ROUTINE THE ABILITY OF NON-EXISTENT
                                ;MEMORY ERROR IS CHECK.
                                ;
                                ;TRANSFER TWO WORDS STARTING WITH THE
                                ;LARGEST ADDRESSABLE MEMORY LOCATION IN THE
                                ;PDP-11/20
                                ;
                                ;
006212  052777  000400  172574 NXMTSM: BIS     #BIT8,@DCS      ;CLEAR THE DISK
006220  012777  000340  172554         MOV     #340,@CSR       ;LOCK UP PROCESSOR
006226  012777  177776  172562         MOV     #-2,@WC         ;SET UP WORD COUNT
006234  012777  177776  172556         MOV     #177776,@CMA    ;SET UP CURRENT ADDRESS
006242  052777  000063  172544         BIS     #63,@DCS        ;ISSUE WRITE
006250  005067  172614                 CLR     WORK
006254  005777  172534         INCNEM: TST     @DCS            ;TEST FOR ERROR
006260  100430                         BMI     TSTNEM          ;BRANCH IF ERROR SET
006262  105777  172526                 TSTB    @DCS            ;TEST FOR ERROR
006266  100414                         BMI     RDYERX          ;REPORT NEM NOT SET
006270  005267  172574                 INC     WORK            ;WAIT FOR ERROR
006274  001367                         BNE     INCNEM
                                        ERROR   \N              ;REPORT ERROR OR BUSY NOT SET
006276  012767  000112  172554 ERR112: MOV     #112,ERCOUNT    ;SET UP ERROR COUNT 112
        000113                          N=N+1
006334  017767  172504  172556         MOV     @DCS,WORK       ;FETCH DCS FOR REPORT
006312  004567  002052                 JSR     %5,STAER        ;REPORT ERROR
006316  000735                         BR      NXMTSM          ;LOOP ON ERROR
                                RDYERX: ERROR   \N
006320  012767  000113  172532 ERR113: MOV     #113,ERCOUNT    ;SET UP ERROR COUNT 113
        000114                          N=N+1
006326  017767  172462  172534         MOV     @DCS,WORK       ;REPORT TIME OUT
006334  004567  002030                 JSR     %5,STAER        ;CONTROL NEVER COMPLETED WRITE
006340  000724                         BR      NXMTSM          ;LOOP ON ERROR
006342  032777  040000  172444 TSTNEM: BIT     #BIT14,@DCS
006350  001011                         BNE     HWDOK           ;BRANCH IF HARD ERROR SET
                                        ERROR   \N
006352  012767  000114  172500 ERR114: MOV     #114,ERCOUNT    ;SET UP ERROR COUNT 114
        000115                          N=N+1
006360  017767  172430  172502         MOV     @DCS,WORK       ;REPORT HWD NOT SET BY NEM
006366  004567  001776                 JSR     %5,STAER        ;REPORT HWD NOT SET
006372  000707                         BR      NXMTSM          ;LOOP ON ERROR
006374  032777  002000  172422 HWDOK:  BIT     #BIT10,@DAE     ;TEST FOR NEM SET
006402  001011                         BNE     CLRNEM          ;NEM SET BE X-FER OK
                                        ERROR   \N
006404  012767  000115  172446 ERR115: MOV     #115,ERCOUNT    ;SET UP ERROR COUNT 115
        000116                          N=N+1
006412  017767  172406  172450         MOV     @DAE,WORK       ;REPORT HARD ERROR REGISTER
006420  004567  001744                 JSR     %5,STAER        ;REPORT NEM NOT SET BY X-FER
006424  000672                         BR      NXMTSM          ;LOOP ON ERROR
006426  052777  000400  172360 CLRNEM: BIS     #BIT8,@DCS      ;CLEAR THE DISK
006434  022777  000200  172352         CMP     #200,@DCS       ;IS ERROR CLEARED
006442  001412                         BEQ     CKHWD           ;ERROR FLAG CLEARED
                                        ERROR   \N
006444  012767  000116  172406 ERR116: MOV     #116,ERCOUNT    ;SET UP ERROR COUNT 116
        000117                          N=N+1
```

```
006452  017767  172336  172410          MOV     @DCS,WORK       ;ERROR NOT CLEARED BY DISK CLEAR
006460  004567  001704                  JSR     %5,STAER        ;REPORT ERROR
006464  000167  177522                  JMP     NXMTSM          ;LOOP ON ERROR
006472  032777  040000  172316  CKHWD:  BIT     #BIT14,@DCS     ;IS HARD ERROR SET
006476  001412                          BEQ     CKNEM           ;HWD CLEARED BY DISK CLEAR
                                        ERROR   \N
006500  012767  000117  172352  ERR117: MOV     #117,ERCOUNT    ;SET UP ERROR COUNT 117
        000120                          N=N+1
006506  017767  172302  172354          MOV     @DCS,WORK       ;REPORT HWD NOT CLEARED
006514  004567  001650                  JSR     %5,STAER        ;
006520  000167  177466                  JMP     NXMTSM          ;LOOP ON ERROR
006524  032777  002000  172272  CKNEM:  BIT     #BIT10,@DAE     ;IS NEM CLEARED BY DISK CLEAR
006532  001410                          BEQ     LPNEM           ;NEM CLEARED BY DISK CLEAR
                                        ERROR   \N
006534  012767  000120  172316  ERR120: MOV     #120,ERCOUNT    ;SET UP ERROR COUNT 120
        000121                          N=N+1
006542  017767  172256  172320          MOV     @DAE,WORK       ;REPORT NEM NOT CLEARED BY DISK CLEAR
006550  000167  177436                  JMP     NXMTSM          ;LOOP ON ERROR
006554  000004                  LPNEM:  SCOPE                   ;ENTER SCOPE LOOP
006556  006212                          NXMTSM
```

```
                                        ;
                                        ;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 PRIORITY7
                                        ;
006560  012767  006664  171416  STA106: MOV     #INT106,204     ;SET UP INTERRUPT VECTOR
006566  012777  000340  172206         MOV     #340,@CSR       ;LOCK OUT ALL INTERRUPTS
006574  005077  172224                 CLR     @DAE            ;CLEAR ADDRESS REGISTERS
006600  005077  172216                 CLR     @DAR
006604  012777  177777  172204         MOV     #177777,@WC     ;SET WORD COUNT TO -1
006612  012777  011110  172200         MOV     #OUTBUF,@CMA    ;LOAD CURRENT ADDRESS
006620  052777  000103  172166         BIS     #103,@DCS       ;GO WRITE (INTERRUPT ENABLED)
006626  005000                         CLR     %0              ;WAIT FOR RDY
006630  005200                         INC     %0
006632  001376                         BNE     .-2
006634  105777  172154                 TSTB    @DCS            ;IS CONTROL STILL NOT RDY
006640  100423                         BMI     LP106           ;NO
006642  017767  172146  172220         MOV     @DCS,WORK       ;YES!
                                       ERROR   \N
006650  012767  000121  172202  ERR121: MOV     #121,ERCOUNT    ;SET UP ERROR COUNT 121
        000122                         N=N+1
006656  004567  001506                 JSR     %5,STAER        ;REPORT CONTROL STILL BUSY
006662  000736                         BR      STA106          ;RESTART ROUTINE
                                        ;
                                        ;PROCESSOR SHOULD NOT TRAP TO INT106
                                        ;PROCESSOR PRIORITY IS LOCKED AT 7
                                        ;
                                       INT106: ERROR   \N
006664  012767  000122  172166  ERR122: MOV     #122,ERCOUNT    ;SET UP ERROR COUNT 122
        000123                         N=N+1
006672  017767  172104  172170         MOV     @CSR,WORK       ;FETCH PROCESSOR PRIORITY
006700  022626                         CMP     (6)+,(6)+
006702  004567  001462                 JSR     %5,STAER        ;REPORT DISK INTERRUPTED
006706  000724                         BR      STA106
006710  000004                 LP106:  SCOPE                   ;ENTER SCOPE LOOP
006712  006560                         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
                                ;
006714  012767  007020  171262  STA110: MOV     #INT110,204     ;SET UP INTERRUPT VECTOR
006722  012777  000300  172052          MOV     #300,@CSR       ;LOCK OUT ALL INTERRUPTS ABOVE
006730  005077  172070                  CLR     @DAE            ;CLEAR ADDRESS REGISTERS
006734  005077  172062                  CLR     @DAR
006740  012777  177777  172050          MOV     #177777,@WC     ;SET WORD COUNT TO -1
006746  012777  011110  172044          MOV     #OUTBUF,@CMA    ;LOAD CURRENT ADDRESS
006754  052777  000103  172032          BIS     #103,@DCS       ;GO WRITE (INTERRUPT ENABLED)
006762  005000                  1$:     CLR     %0              ;WAIT FOR NOT BUSY
006764  005200                          INC     %0
006766  001376                          BNE     .-2
006770  105777  172020                  TSTB    @DCS            ;IS CONTROL STILL BUSY
006774  100423                          BMI     LP110           ;NO
006776  017767  172012  172064          MOV     @DCS,WORK       ;YES!
                                        ERROR   \N
007004  012767  000123  172046  ERR123: MOV     #123,ERCOUNT    ;SET UP ERROR COUNT 123
        000124                          N=N+1
007012  004567  001352                  JSR     %5,STAER        ;REPORT CONTROL STILL BUSY
007016  000736                          BR      STA110          ;RESTART ROUTINE
                                ;
                                ;PROCESSOR SHOULD NOT TRAP TO INT106
                                ;PROCESSOR PRIORITY IS LOCKED AT 6
                                ;
                                INT110: ERROR   \N
007020  012767  000124  172032  ERR124: MOV     #124,ERCOUNT    ;SET UP ERROR COUNT 124
        000125                          N=N+1
007026  017767  171750  172034          MOV     @CSR,WORK       ;FETCH PROCESSOR PRIORITY
007034  022626                          CMP     (6)+,(6)+
007036  004567  001326                  JSR     %5,STAER        ;REPORT DISK INTERRUPTED
007042  000724                          BR      STA110
                                ;
007044  000004                  LP110:  SCOPE                   ;ENTER SCOPE LOOP
007046  006714                          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
                                ;
007050  012767  007154  171126  STA112: MOV     #INT112,204     ;SET UP INTERRUPT VECTOR
007056  012777  000240  171716          MOV     #240,@CSR       ;LOCK OUT ALL INTERRUPTS ABOVE
007064  005077  171734                  CLR     @DAE            ;CLEAR ADDRESS REGISTERS
007070  005077  171726                  CLR     @DAR
007074  012777  177777  171714          MOV     #177777,@WC     ;SET WORD COUNT TO -1
007102  012777  011110  171710          MOV     #OUTBUF,@CMA    ;LOAD CURRENT ADDRESS
007110  052777  000103  171676          BIS     #103,@DCS       ;GO WRITE (INTERRUPT ENABLED)
007116  005000                  1$:     CLR     %0              ;WAIT FOR NOT BUSY
```

```
007120  005200                          INC     %0
007122  001376                          BNE     .-2
007124  105777  171664                  TSTB    @DCS            ;IS CONTROL STILL BUSY
007130  100423                          BMI     LP112           ;NO
007132  017767  171656  171730          MOV     @DCS,WORK       ;YES!
                                        ERROR   \N
007140  012767  000125  171712  ERR125: MOV     #125,ERCOUNT    ;SET UP ERROR COUNT 125
        000126                          N=N+1
007146  004567  001216                  JSR     %5,STAER        ;REPORT CONTROL STILL BUSY
007152  000736                          BR      STA112          ;RESTART ROUTINE
```

```
                                ;
                                ;PROCESSOR SHOULD NOT TRAP TO INT106
                                ;PROCESSOR PRIORITY IS LOCKED AT 7
                                ;
                                INT112: ERROR   \N
007154  012767  000126  171676  ERR126: MOV     #126,ERCOUNT    ;SET UP ERROR COUNT 126
        000127                          N=N+1
007162  017767  171614  171700          MOV     @CSR,WORK       ;FETCH PROCESSOR PRIORITY
007170  022626                          CMP     (6)+,(6)+
007172  004567  001172                  JSR     %5,STAER        ;REPORT DISK INTERRUPTED
007176  000724                          BR      STA112
                                ;
007200  000004                  LP112:  SCOPE                   ;ENTER SCOPE LOOP
007202  007050                          STA112
                                ;
                                ;
                                ;
                                ;THIS ROUTINE WILL TEST THE ABILITY OF THE DISK CONTROL
                                ;TO TRAP AT BR5 WHEN THE DONE FLAG IS SET.
                                ;
007204  052777  000400  171602  STA114: BIS     #BIT8,@DCS      ;CLEAR THE DISK
007212  012767  007310  170764          MOV     #INT114,204     ;SET UP DISK TRAP VECTOR
007220  012777  000200  171554          MOV     #200,@CSR       ;SET PROCESSOR TO PRIORITY 4
007226  005077  171572                  CLR     @DAE            ;CLEAR EXT ADDRESS BITS
007232  005077  171564                  CLR     @DAR            ;CLEAR LOW ORDER ADDRESS BITS
007236  012777  177777  171552          MOV     #177777,@WC     ;SET WORD COUNT TO -1
007244  012777  011110  171546          MOV     #OUTBUF,@CMA    ;LOAD CURRENT ADDRESS
007252  052777  000103  171534          BIS     #103,@DCS       ;WRITE (INTERRUPT ENABLE
007260  005000                          CLR     %0
007262  005200                          INC     %0              ;WAIT FOR INTERRUPT TO OCCUR
007264  001376                          BNE     .-2
                                        ERROR   \N
007266  012767  000127  171564  ERR127: MOV     #127,ERCOUNT    ;SET UP ERROR COUNT 127
        000130                          N=N+1
007274  017767  171514  171566          MOV     @DCS,WORK       ;FETCH CONTENTS OF DCS
007302  004567  001062                  JSR     %5,STAER        ;REPORT INTERRUPT NO INTERRUPT
007306  000736                          BR      STA114          ;RESTART ROUTINE
                                ;
                                ;
                                ;
007310  022626                  INT114: CMP     (6)+,(6)+       ;TRAP OK
007312  000004                          SCOPE                   ;ENTER SCOPE LOOP
007314  007204                          STA114
                                ;* * * ADDRESS TEST 1 * * *
                                ;EXECUTE A ONE WORD WRITE
                                ;IF THE TIMING ON THE DISK IS CORRECT
                                ;THE TERMINATING ADDRESS IN THE DAR REGISTER
                                ;WILL EQUAL THE ADDRESS +1 OF THE WORD
                                ;THAT WAS WRITTEN
                                ;
                                ;NOTE: DATA IS NOT CHECKED IN THIS TEST.
                                ;
007316  012706  001000          ADT1:   MOV     #1000,%6        ;SET UP STACK
007322  012767  000001  171510          MOV     #1,WRDCT        ;SET UP WORD COUNT
```

```
007330  012767  011110  171512          MOV     #OUTBUF,BUF     ;SET UP CURRENT ADDRESS
007336  005067  171502                  CLR     DMA
007342  005067  171474                  CLR     TRACK
007346  052777  000400  171440  WRADT:  BIS     #BIT8,@DCS      ;CLEAR THE DISK
007354  104403                          WRITE
007356  105777  171432                  TSTB    @DCS            ;CHECK FOR READY
007362  100375                          BPL     .-4
007364  005777  171424                  TST     @DCS            ;CHECK FOR ERROR
007370  100011                          BPL     CHKADT          ;BRANCH IF NO ERROR
007372  017767  171416  171470          MOV     @DCS,WORK
                                        ERROR   \N
007400  012767  000130  171452  ERR130: MOV     #130,ERCOUNT    ;SET UP ERROR COUNT 130
        000131                          N=N+1
007406  004567  000756                  JSR     %5,STAER        ;REPORT ERROR
007412  000755                          BR      WRADT           ;LOOP ON ERROR
007414  016767  171424  171450  CHKADT: MOV     DMA,WORK1
007422  005267  171444                  INC     WORK1           ;WHAT DAR SHOULD CONTAIN
007426  017767  171370  171434          MOV     @DAR,WORK
007434  026767  171432  171426          CMP     WORK1,WORK      ;IS DAR CORRECT
007442  001406                          BEQ     INCDAR          ;YES DAR IS CORRECT
                                        ERROR   \N
007444  012767  000131  171406  ERR131: MOV     #131,ERCOUNT    ;SET UP ERROR COUNT 131
        000132                          N=N+1
007452  004567  000764                  JSR     %5,STAER1       ;REPORT DAR NOT CORRECT
007456  000733                          BR      WRADT           ;LOOP ON ERROR
007460  022767  004000  171404  INCDAR: CMP     #4000,WORK1     ;IS IT THE LAST ADDR.
007466  001405                          BEQ     LPADT           ;LAST ADDRESS EXIT
007470  016767  171376  171346          MOV     WORK1,DMA       ;SET UP FOR NEXT ADDR.
007476  000167  177644                  JMP     WRADT           ;CHECK NEXT ADDRESS
007502  032777  004000  171270  LPADT:  BIT     #BIT11,@SR      ;LOOP ON TEST
007510  001402                          BEQ     .+6             ;NO!
007512  000167  177600                  JMP     ADT1            ;YES! BIT11 SET IN SR
                                ;
                                ;
                                ;
                                ;
                                ;
                                ;* * * ADDRESS TEST 2X  * * *
                                ;EXECUTE A ONE WORD READ
                                ;IF THE TIMING ON THE DISK IS CORRECT
                                ;THE TERMINATING ADDRESS IN THE DAR REGISTER
                                ;WILL EQUAL THE ADDRESS +1 OF THE WORD
                                ;THAT WAS READ
                                ;NOTE: DATA IS NOT CHECK IN THIS TEST.
                                ;
007516  012706  001000          ADT2X:  MOV     #1000,%6        ;SET UP STACK
007522  012767  000001  171310          MOV     #1,WRDCT        ;SET UP WORD COUNT
007530  012767  011120  171312          MOV     #INBUF,BUF      ;SET UP CURRENT ADDRESS
007536  005067  171302                  CLR     DMA
007542  005067  171274                  CLR     TRACK
007546  052777  000400  171240  ROADT:  BIS     #BIT8,@DCS      ;CLEAR THE DISK
007554  104405                          READ
007556  105777  171232                  TSTB    @DCS            ;CHECK FOR READY
007562  100375                          BPL     .-4
007564  005777  171224                  TST     @DCS            ;CHECK FOR ERROR
```

```
007570  100011                          BPL     XCHKDT          ;BRANCH IF NO ERROR
007572  017767  171216  171270          MOV     @DCS,WORK
                                        ERROR   \N
007600  012767  000132  171252  ERR132: MOV     #132,ERCOUNT    ;SET UP ERROR COUNT 132
        000133                          N=N+1
007606  004567  000556                  JSR     %5,STAER        ;REPORT ERROR
007612  000755                          BR      ROADT           ;LOOP ON ERROR
007614  016767  171224  171250  XCHKDT: MOV     DMA,WORK1
007622  005267  171244                  INC     WORK1           ;WHAT DAR SHOULD CONTAIN
007626  017767  171170  171234          MOV     @DAR,WORK
007634  026767  171232  171226          CMP     WORK1,WORK      ;IS DAR CORRECT
007642  001406                          BEQ     ADDAR           ;YES DAR IS CORRECT
                                        ERROR   \N
007644  012767  000133  171206  ERR133: MOV     #133,ERCOUNT    ;SET UP ERROR COUNT 133
        000134                          N=N+1
007652  004567  000564                  JSR     %5,STAER1       ;REPORT DAR NOT CORRECT
007656  000733                          BR      ROADT           ;LOOP ON ERROR
007660  022767  004000  171204  ADDAR:  CMP     #4000,WORK1     ;IS IT THE LAST ADDR.
```

```
007666  001405                          BEQ     LPADT2          ;LAST ADDRESS EXIT
007670  016767  171176  171146          MOV     WORK1,DMA       ;SET UP FOR NEXT ADDR
007676  000167  177644                  JMP     ROADT           ;CHECK NEXT ADDRESS
007702  032777  004000  171070  LPADT2: BIT     #BIT11,@SR      ;LOOP ON TEST
007710  001402                          BEQ     .+6             ;NO:
007712  000167  177600                  JMP     ADT2X           ;YES! BIT11 SET IN SR
                                ;
                                ;
                                ;
                                ;
                                ;

007716  104001                          EMT+1                   ;REPORT END
007720  011102                          END
007722  000167  171260                  JMP     STAI1           ;RESTART TEST
                                ;
                                ;SCOPE LOOP ROUTINE
                                ;IF BIT 11 SET LOOP ON TEST
                                ;
007726  032777  004000  171044  LOOP:   BIT     #BIT11,@SR      ;TST FOR BIT 11
007734  001402                          BEQ     .+6             ;BIT 11 NOT SET
007736  013646                          MOV     @(6)+,-(6)
007740  000002                          RTI                     ;BIT 11 SET! LOOP ON TEST
007742  005767  171120                  TST     PASS            ;TEST TO SET UP PASS COUNT
007746  001003                          BNE     .+10            ;PASS COUNT SET
007750  012767  000025  171110          MOV     #25,PASS        ;SET UP PASS COUNT
007756  005367  171104                  DEC     PASS            ;SUB. -1 EACH PASS
007762  001402                          BEQ     .+6
007764  013646                          MOV     @(6)+,-(6)
007766  000002                          RTI                     ;LOOP ON TEST
007770  062716  000002                  ADD     #2,(6)          ;INDEX POINTER FOR NEXT TEST
007774  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.
                                ;
007776  016705  171024        DISK:   MOV     DBR,%5          ;SET UP TO LOAD DISK REG
010002  016745  171034                MOV     TRACK,-(5)      ;LOAD TRACK NUMBER
010006  016745  171032                MOV     DMA,-(5)        ;LOAD WORD ADDRESS
010012  016745  171032                MOV     BUF,-(5)        ;SET UP CURRENT ADDRESS
010016  016745  171016                MOV     WRDCT,-(5)      ;LOAD WORD COUNT
010022  005115                       COM     (5)             ;SET UP TWO'S COMPLEMENT
010024  005215                       INC     (5)
010026  011604                       MOV     (6),%4
010030  014467  171034                MOV     -(4),WORK       ;
010034  042767  177600  171026        BIC     #177600,WORK    ;MASK FUNCTION BITS
010042  016745  171022                MOV     WORK,-(5)       ;LOAD FUNCTION REG.
010046  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
010050  017777  170724  170740  SELWC:  MOV     @SR,@WC         ;MOV SR INTO WORD COUNT REG
010056  000774                          BR      SELWC
                                ;
                                ;CURRENT ADDRESS REGISTER
010060  017777  170714  170732  SELCMA: MOV     @SR,@CMA        ;MOV SR INTO CURRENT ADDR REG
010066  000774                          BR      SELCMA
                                ;
                                ;DISK ADDRESS REGISTER
010070  017777  170704  170724  SELDAR: MOV     @SR,@DAR        ;MOV SR INTO DISK ADDR REG
010076  000774                          BR      SELDAR
                                ;
                                ;DISK ADDRESS EXT AND ERROR REGISTER
010100  017777  170674  170716  SELDAE: MOV     @SR,@DAE        ;MOV SR INTO DISK ADDR EXT REG
010106  000774                          BR      SELDAE
                                ;
                                ;DATA BUFFER REGISTER
010110  017777  170664  170710  SELDBR: MOV     @SR,@DBR        ; MOV SR INTO DATA BUFFER
010116  000774                          BR      SELDBR
                                ;
                                ;
                                ;LOOK AHEAD REGISTER
010120  017700  170706          MOVLK:  MOV     @ADS,%0         ;FETCH LOOK AHEAD
010124  000005                          RESET                   ;DISPLAY IN LIGHTS
010126  000005                          RESET                   ;
010130  000773                          BR      MOVLK
                                ;
                                ;DISK CONTROL STATUS REGISTER
010132  012777  000340  170642  SELDCS: MOV     #340,@CSR       ;LOCK UP INTERRUPTS
010140  012777  177777  170650          MOV     #177777,@WC     ;SET WORD COUNT -1 WORD
010146  012777  011110  170644          MOV     #OUTBUF,@CMA    ;SET UP CURRENT ADDRESS
010154  017777  170620  170632          MOV     @SR,@DCS        ;MOV SR INTO CONTROL REG
010162  032777  000001  170624          BIT     #BIT0,@DCS      ;IS FUNCTION BITS SET
010170  001760                          BEQ     SELDCS          ;FUNCTION BITS NOT SET
010172  105777  170616          DKBUSY: TSTB    @DCS            ;TEST FOR DISK READY
010176  100375                          BPL     DKBUSY          ;DISK STILL NOT READY
010200  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
                                        ;SR6-0 EQUALS THE TRACK NUMBER
                                        ;SR9-7 EQUALS THE DISK NUMBER
                                        ;
010202  052777  000400  170604 STAMP:  BIS     #BIT8,@DCS
010210  017767  170564  170654         MOV     @SR,WORK1       ;FETCH SR
010216  016767  170650  170644         MOV     WORK1,WORK
010224  042767  176000  170636         BIC     #176000,WORK    ;MASK DISK AND TRACK NO.
010232  006067  170632                 ROR     WORK
010236  006067  170626                 ROR     WORK
010242  006067  170622                 ROR     WORK
010246  006067  170616                 ROR     WORK
010252  006067  170612                 ROR     WORK
010256  016777  170606  170540         MOV     WORK,@DAE       ;DISK EXT. ADDR. REG. LOADED
010264  017767  170510  170576         MOV     @SR,WORK
010272  000367  170572                 SWAB    WORK
010276  006167  170566                 ROL     WORK
010302  006167  170562                 ROL     WORK
010306  006167  170556                 ROL     WORK
010312  042767  003777  170550         BIC     #3777,WORK
010320  016777  170544  170474         MOV     WORK,@DAR       ;DISK ADDRESS REG LOADED
010326  012777  011120  170464         MOV     #INBUF,@CMA     ;LOAD CURRENT ADDRESS
010334  012777  177777  170454         MOV     #177777,@WC     ;LOAD WORD COUNT
010342  052777  000005  170444         BIS     #5,@DCS         ;GO AND READ
010350  105777  170440         CTBUSY: TSTB    @DCS            ;TEST FOR CONTROL READY
010354  100375                 BPL     CTBUSY          ;WAIT FOR CONTROL READY
010356  026777  170510  170414 SRCHG:  CMP     WORK1,@SR
010364  001306                 BNE     STAMP           ;SR HAS CHANGED
010366  000773                 BR      SRCHG           ;SR HAS NOT CHANGED
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
```

```
                                ;
                                ;ROUTINE TO REPORT ERROR COUNT AND CONTENTS OF ONE REGISTER
                                ;
010370  004567  000332       STAER:  JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
010374  001070                       WORK                    ;DATA TO BE CONVERTED
010376  011062                       MES6                    ;ADDRESS OF MESSAGE
010400  000006                       6
010402  004567  000320               JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
010406  001060                       ERCOUNT                 ;ERROR COUNT TO BE CONVERTED
010410  011016                       HED5                    ;ADDRESS OF MESSAGE
010412  000003                       3
010414  104000                       EMT     +0              ;REPORT MESSAGE
010416  011014                       HED5A
010420  011016                       HED5
010422  011062                       MES6
010424  177777                       -1
010426  032777  002000  170344       BIT     #BIT10,@SR
010434  001401                       BEQ     .+4
010436  000000                       HALT
010440  000205                       RTS     %5              ;EXIT ROUTINE
                                ;
                                ;ROUTINE TO REPORT ERROR COUNT AND THE CONTENTS OF TWO REGISTERS
                                ;
                                ;
010442  004567  000260       STAER1: JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
010446  001070                       WORK                    ;DATA TO BE CONVERTED
010450  011062                       MES6                    ;ADDRESS OF MESSAGE
010452  000006                       6
010454  004567  000246               JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
010460  001072                       WORK1                   ;DATA TO BE CONVERT
010462  011037                       MES5                    ;ADDRESS OF MESSAGE
010464  000006                       6
010466  004567  000234               JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
010472  001060                       ERCOUNT                 ;ERROR COUNT TO BE CONVERTED
010474  011016                       HED5                    ;ADDRESS OF MESSAGE
010476  000003                       3
010500  104000                       EMT     +0              ;REPORT MESSAGE
010502  011014                       HED5A
010504  011016                       HED5
010506  011037                       MES5
010510  011062                       MES6
010512  177777                       -1
010514  032777  002000  170256       BIT     #BIT10,@SR
010522  001401                       BEQ     .+4
010524  000000                       HALT
010526  000205                       RTS     %5              ;EXIT ROUTINE
                                ;
                                ;
                                ;ROUTINE TO DECODE EMT CALLS
                                ;EMT+1=TYPE ONE LINE OF TEXT
                                ;EMT+0=TYPE A SERIES OF LINES
010530  011600               EMTRP:  MOV     (6),%0
010532  022740  104001               CMP     #EMT+1,-(0)     ;WAS THE CALL EMT+1
```

```
010536  001056                  BNE     TYPS            ;NO! TYPE A SERIES OF LINES OF TEXT
010540  000400                  BR      TYP             ;YES TYPE ONE LINE OF TEXT
```

```
                                        ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
010542  011600                TYP:    MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
010544  062716  000002                ADD     #2,@%6          ;SET UP EXIT.
010550  011000                        MOV     @%0,%0          ;ADDRESS OF MESSAGE TO R0.
010552  112067  000114        TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
010556  122767  000100  000106        CMPB    #100,TYPDAT     ;CHECK FOR "@" CHARACTER
010564  001001                        BNE     TYPC            ;BRANCH IF NOT "@".
010566  000002                        RTI                     ;TERMINATOR CHAR. DONE. EXIT.
010570  122767  000045  000074  TYPC: CMPB    #45,TYPDAT      ;CHECK FOR "%".
010576  001422                        BEQ     TYPF            ;BRANCH IF "%".
010600  122767  000042  000064        CMPB    #42,TYPDAT      ;NOT "%". CHECK FOR "#".
010606  001423                        BEQ     TYPG            ;BRANCH IF "#"
010610  004767  000002                JSR     %7,TYPD         ;TYPE CHAR IN TYPDAT
010614  000756                        BR      TYPA
010616  032777  040000  170154  TYPD: BIT     #BIT14,@SR
010624  001006                        BNE     TYEXIT
010626  116777  000040  170150        MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
010634  105777  170150                TSTB    @TPS            ;WAIT FOR DONE FLAG.
010640  100375                        BPL     .-4
010642  000207                TYEXIT: RTS     %7              ;EXIT
010644  112767  000015  000020  TYPF: MOVB    #15,TYPDAT      ;MOVE CARRIAGE RETURN CODE TO TYPDAT
010652  004767  177740                JSR     %7,TYPD         ;GO TYPE CHAR.
010656  112767  000012  000006  TYPG: MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT.
010664  004767  177726                JSR     %7,TYPD         ;GO TYPE CHAR.
010670  000730                        BR      TYPA
010672  000000                TYPDAT: 0
                                        ;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
010674  011600                TYPS:   MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
010676  062716  000002                ADD     #2,@%6          ;UPDATE TO NEXT MESSAGE ADDRESS
010702  011067  000014                MOV     @%0,TYPSB       ;ADDRESS OF MESSAGE TO TYPSB
010706  022767  177777  000006        CMP     #-1,TYPSB       ;CHECK FOR TERMINATOR
010714  001001                        BNE     TYPSA           ;BRANCH IF NOT TERMINATOR.
010716  000002                        RTI                     ;TERMINATOR. EXIT
010720  104001                TYPSA:  EMT     +1              ;CALL ON TYP SUB TO TYPE MESSAGE
010722  000000                TYPSB:  0                       ;ADDRESS OF MESSAGE GOES HERE
010724  000763                        BR      TYPS            ;GO PROCESS NEXT MESSAGE
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;OCTAL TO ASCII CONVERT ROUTINE
                                        ;
                                        ;ENTER ROUTINE AS FOLLOWS
                                        ;JSR%5,CONV
                                        ;ADDR#=ADDRESS OF NUMBER TO BE CONVERTED
                                        ;ADDR BYTE=LSB OF WHERE ASCII IS GOING
                                        ;ASCII#=THE NUMBER OF ASCII CHAR. TO BE CONVERTED
                                        ;
                                        ;
010726  013567  000054        CONV:   MOV     @(5)+,ACNVX     ;VALUE OF # TO BE CONVERTED
010732  012501                        MOV     (5)+,%1         ;ASCII ADDR
010734  012502                        MOV     (5)+,%2         ;# OF ASCII CHAR
010736  060201                        ADD     %2,%1
```

```
010740  016703  000042          ACVN:   MOV     ACNVX,%3
010744  042703  177770                  BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT OCTAL#
010750  062703  000060                  ADD     #60,%3          ;SET UP ASCII#
010754  110341                          MOVB    %3,-(1)         ;STORE ASCII CHAR
010756  042767  000007  000022          BIC     #7,ACNVX
010764  006067  000016                  ROR     ACNVX           ;ROTATE OCTAL#
010770  006067  000012                  ROR     ACNVX
010774  006067  000006                  ROR     ACNVX
011000  005302                          DEC     %2              ;-1 FROM ASCII CHAR COUNT
011002  001356                          BNE     ACVN
011004  000205                          RTS     %5              ;EXIT # CONVERTED
011006  000000          ACNVX:  0                               ;WORK REGISTER
                        ;
                        ;
                        ;
                        ;
```

```
011010  000000                    TEXBUF: 0
011012  000000                    TSTCH:  0
                                  ;
                                  ;
                                  ;
                                  ;
                                  ;
                                  ;ERROR MESSAGE HEADERS
                                  ;

        011014                            .EVEN
011014     045                    HED5A:  .ASCII  /%@/
011015     100

011016     040                    HED5:   .ASCII  /    ERROR COUNT @/
011017     040
011020     040
011021     040
011022     105
011023     122
011024     122
011025     117
011026     122
011027     040
011030     103
011031     117
011032     125
011033     116
011034     124
011035     040
011036     100

                                  ;
                                  ;
                                  ;MESSAGE TRAILERS
                                  ;
                                  ;
                                  ;
011037     040                    MES5:   .ASCII  /       GOOD DATA  @/
011040     040
011041     040
011042     040
011043     040
011044     040
011045     040
011046     107
011047     117
011050     117
011051     104
011052     040
011053     104
011054     101
011055     124
```

```
011056      101
011057      040
011060      040
011061      100

                                ;
                                ;
                                ;
011062      040                 MES6:   .ASCII  /       BAD DATA@/
011063      040
011064      040
011065      040
011066      040
011067      040
011070      040
011071      102
011072      101
011073      104
011074      040
011075      104
011076      101
011077      124
011100      101
011101      100

                                ;
                                ;
                                ;
011102      045                 END:    .ASCII  /%END@/
011103      105
011104      116
011105      104
011106      100
```

```
        011110                          .EVEN
                                        ;
                                        ;
                                        ;
011110  000000                  OUTBUF: .WORD   0,0,0,0
011112  000000
011114  000000
011116  000000
                                        ;
                                        ;
011120  000000                  INBUF:  .WORD   0,0,0,0
011122  000000
011124  000000
011126  000000
                                        ;
                                        ;
                                        ;
                                        ;
        000001                          .END
```

ACNVX	011006	EROR21	003426	ERR120	006534	ERR57	004332
ACVN	010740	EROR22	003454	ERR121	006650	ERR6	001436
ADDAR	007660	EROR23	003516	ERR122	006664	ERR60	004370
ADS	001032	EROR24	003544	ERR123	007004	ERR61	004422
ADT1	007316	EROR25	003606	ERR124	007020	ERR62	004464
ADT2X	007516	EROR26	003654	ERR125	007140	ERR63	004512
BIT0	000001	EROR27	003720	ERR126	007154	ERR64	004554
BIT1	000002	EROR3	002470	ERR127	007266	ERR65	004622
BIT10	002000	EROR30	003776	ERR13	001724	ERR66	004666
BIT11	004000	EROR31	004030	ERR130	007400	ERR67	004726
BIT12	010000	EROR32	004072	ERR131	007444	ERR7	001466
BIT13	020000	EROR33	004120	ERR132	007600	ERR70	004760
BIT14	040000	EROR34	004162	ERR133	007644	ERR71	005022
BIT15	100000	EROR35	004256	ERR14	001774	ERR72	005050
BIT2	000004	EROR36	004332	ERR15	002036	ERR73	005112
BIT3	000010	EROR37	004370	ERR16	002106	ERR74	005224
BIT4	000020	EROR4	002516	ERR17	002154	ERR75	005254
BIT5	000040	EROR40	004422	ERR2	001276	ERR76	005324
BIT6	000100	EROR41	004464	ERR20	002224	ERR77	005436
BIT7	000200	EROR42	004512	ERR21	002266	FLAG	001034
BIT8	000400	EROR43	004554	ERR22	002356	HED5	011016
BIT9	001000	EROR44	004622	ERR23	002432	HED5A	011014
BUF	001050	EROR45	004666	ERR24	002470	HWDOK	006374
CHKADT	007414	EROR46	004726	ERR25	002516	INBUF	011120
CKHWD	006470	EROR47	004760	ERR26	002560	INCBUS	002740
CKNEM	006524	EROR5	002560	ERR27	002606	INCDAR	007460
CLRNEM	006426	EROR50	005022	ERR3	001326	INCNEM	006254
CMA	001020	EROR51	005050	ERR30	002650	INCRD	004664
CONV	010726	EROR52	005112	ERR31	002716	INCWAT	002376
CSR	001002	EROR6	002606	ERR32	002762	INT106	006664
CTBUSY	010350	EROR7	002650	ERR33	003022	INT110	007020
DAE	001024	ERR0	001226	ERR34	003054	INT112	007154
DAR	001022	ERR1	001246	ERR35	003116	INT114	007310
DBR	001026	ERR10	001536	ERR36	003144	INXDBK	005456
DCS	001014	ERR100	005500	ERR37	003206	LOOP	007726
DISK	007776	ERR101	005532	ERR4	001356	LP106	006710
DKBUSY	010172	ERR102	005572	ERR40	003302	LP110	007044
DMA	001044	ERR103	005706	ERR41	003356	LP112	007200
EMTRP	010530	ERR104	005740	ERR42	003426	LPADT	007502
END	011102	ERR105	005770	ERR43	003454	LPADT2	007702
ERCOUN	001060	ERR106	006046	ERR44	003516	LPNEM	006554
EROR1	002356	ERR107	006076	ERR45	003544	LPST1	001260
EROR10	002716	ERR11	001606	ERR46	003606	LPST10	001530
EROR11	002762	ERR110	006132	ERR47	003654	LPST11	001620
EROR12	003022	ERR111	006172	ERR5	001406	LPST12	001670
EROR13	003054	ERR112	006276	ERR50	003720	LPST13	001736
EROR14	003116	ERR113	006320	ERR51	003776	LPST14	002006
EROR15	003144	ERR114	006352	ERR52	004030	LPST15	002050
EROR16	003206	ERR115	006404	ERR53	004072	LPST16	002120
EROR17	003302	ERR116	006444	ERR54	004120	LPST17	002166
EROR2	002432	ERR117	006500	ERR55	004162	LPST2	001310
EROR20	003356	ERR12	001656	ERR56	004256	LPST20	002236

```
LPST21  002300          STA114  007204          STAI63  004502
LPST22  003224          STAER   010370          STAI64  004530
LPST3   001340          STAER1  010442          STAI65  004572
LPST4   001370          STAI1   001206          STAI66  004640
LPST40  004200          STAI10  001504          STAI67  004704
LPST5   001420          STAI11  001554          STAI7   001454
LPST56  005130          STAI12  001624          STAI70  004744
LPST6   001450          STAI13  001674          STAI71  004776
LPST7   001500          STAI14  001742          STAI72  005040
LPST74  005336          STAI15  002012          STAI73  005066
LPST77  005610          STAI16  002054          STAI74  005134
LPSX10  006004          STAI17  002124          STAI75  005240
LPX105  006062          STAI2   001264          STAI76  005272
LPX106  006112          STAI20  002172          STAI77  005342
LPX107  006146          STAI21  002242          STAMP   010202
LPX108  006206          STAI22  002304          START   001076
LTSWT   005202          STAI23  002372          SWRDCT  001056
MA      001030          STAI24  002446          TDMA    001054
MES5    011037          STAI25  002506          TEXBUF  011010
MES6    011062          STAI26  002534          TKB     001006
MOVLK   010120          STAI27  002576          TKS     001012
N       000134          STAI3   001314          TPB     001004
NXMTSM  006212          STAI30  002624          TPS     001010
OUTBUF  011110          STAI31  002666          TRACK   001042
PASS    001066          STAI32  002734          TSTCH   011012
PATNU   001046          STAI33  003000          TSTNEM  006342
RANNU   001036          STAI34  003040          TWRDCT  001052
RDWAT   004276          STAI35  003072          TYEXIT  010642
RDYERX  006320          STAI36  003134          TYP     010542
READ    104405          STAI37  003162          TYPA    010552
ROADT   007546          STAI4   001344          TYPC    010570
SAV1    001064          STAI40  003230          TYPD    010616
SAVE    001062          STAI41  003316          TYPDAT  010672
SCOPE   000004          STAI42  003372          TYPF    010644
SELCMA  010060          STAI43  003444          TYPG    010656
SELDAE  010100          STAI44  003472          TYPS    010674
SELDAR  010070          STAI45  003534          TYPSA   010720
SELDBR  010110          STAI46  003562          TYPSB   010722
SELDCS  010132          STAI47  003624          WAFBUS  005664
SELWC   010050          STAI5   001374          WATRDY  006116
SR      001000          STAI50  003672          WC      001016
SRCHG   010356          STAI51  003736          WCBUSI  003676
ST105X  006010          STAI52  004014          WCWAT   003322
STA100  005452          STAI53  004046          WORK    001070
STA101  005516          STAI54  004110          WORK1   001072
STA102  005550          STAI55  004136          WORK2   001074
STA103  005614          STAI56  004204          WRADT   007346
STA104  005722          STAI57  004272          WRCHEC  104407
STA105  005754          STAI6   001424          WRDCT   001040
STA106  006560          STAI60  004346          WRITE   104403
STA110  006714          STAI61  004406          XCHKDT  007614
STA112  007050          STAI62  004440          XSTAI1  001240
```

```
ERRORS DETECTED: 0
RUN-TIME:  20 SECONDS
5K CORE USED
```