RC11

DATA TEST

MD-11-DZRCB-B

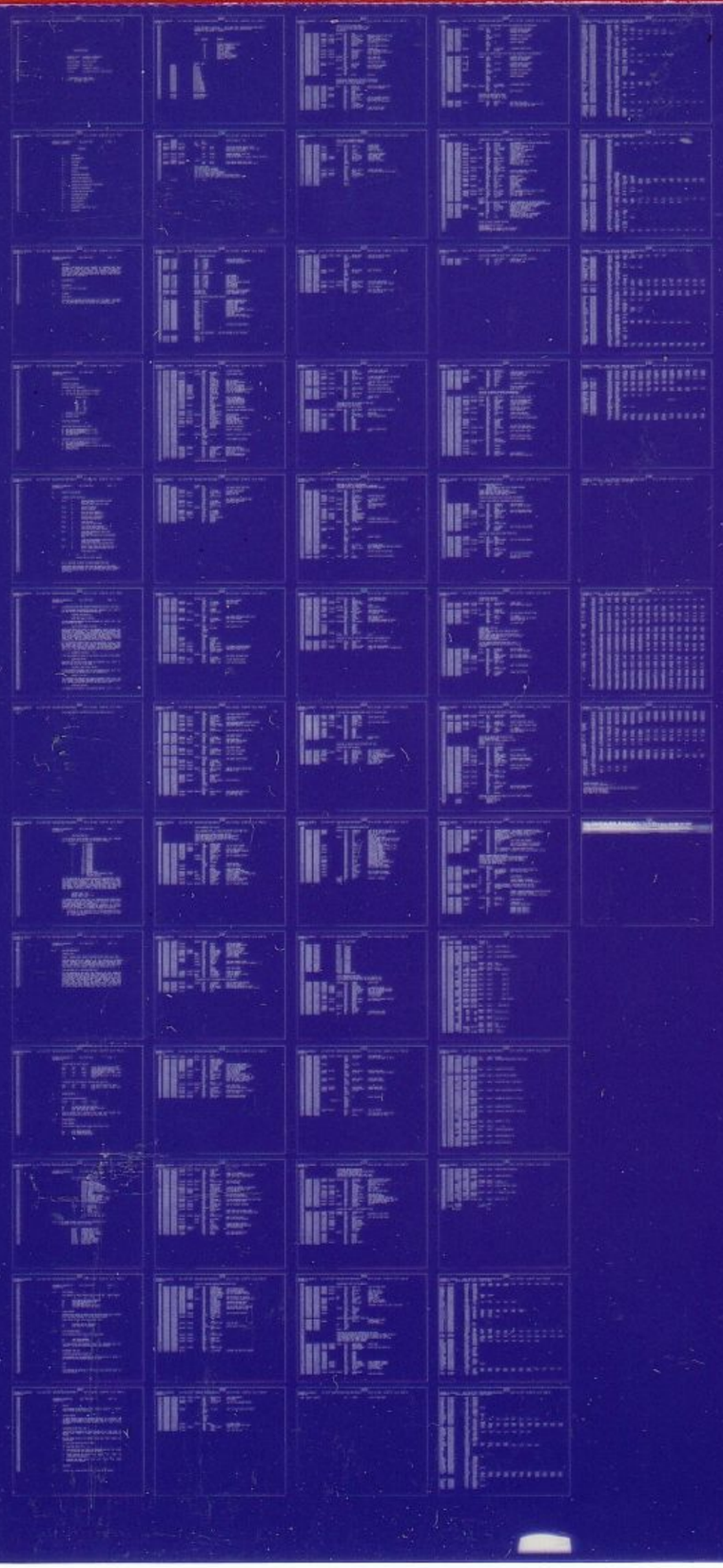
EP DZRCB B DL A

OCT 1976

digital

FICHE 1 OF 1

Made in U.S.A.



```
.REM    %
```

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZRCB-B-D
REPLACES:	MAINDEC-11-D5JA
PRODUCT NAME:	RC11 DISK DATA
DATE CREATED:	APRIL-1973
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	BOB BRAIN/STANLEY HARACKIEWICZ

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DESCRIPTION

1. ABSTRACT

THE RC11 DISK DATA TEST IS A SERIES OF ADDRESS AND DATA RELIABILITY ROUTINES WHICH VERIFY TO THE USER THE DISK CONTROL (RC11) AND DISK (RS64) ARE OPERATING CORRECTLY. THIS TEST USED IN CONJUNCTION WITH THE RC11 DISKLESS AND RC11 MULTI DISK ASSURES THE USER OF AN ERROR FREE SYSTEM, WHEN USED IN ITS ENTIRETY.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 WITH RC11 AND RS64

2.2 STORAGE

DATA TEST

MAIN BODY OF PROGRAM OCCUPIES FROM LOC 0 TO 10500. THE REST OF THE AVAILABLE CORE IS DIVIDED INTO 2 BUFFERS. THE FIRST IS THE WRITE BUFFER AND THE SECOND IS THE READ BUFFER.

3. LOADING PROCEDURE

3.1 METHOD OF LOADING

PROGRAM FORMAT ABSOLUTE

A. VERIFY THE BOOT LOADER IS IN MEMORY.

B. SET SWITCH REGISTER EQUAL TO *500

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

C. DEPRESS LOAD ADDRESS.

D. DEPRESS START.

4. STARTING PROCEDURE

4.1 WORST CASE DISK TEST UNIT ZERO

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

4.2 OPERATOR INTERVENTION FOR DATA TEST ONLY.

A) SET SWITCH REGISTER EQUAL TO 200
B) DEPRESS LOAD ADDRESS
C) SET SWITCH REGISTER EQUAL TO MODE OF OPERATION
(REF. SEC 5.)
D) DEPRESS START.

5. OPERATING PROCEDURE

5.1 CONTROL SWITCH SETTINGS

SW15	1	ENTER PROGRAM CONVERSATION MODE REF. SEC. 5.2
	0	OPERATE WORST CASE DISK ZERO
SW14	1	DELETE TYPEOUTS
	0	REPORT MESSAGE
SW13	1	HALT ON FLAG (READY)
	0	EXECUTE NEXT OPERATION
SW12	1	DELETE DATA COMPARISONS
	0	COMPARE DATA BUFFERS
SW11	1	LOOP ON TEST
	0	CONTINUE TO NEXT TEST
SW10	1	HALT AFTER ERROR REPORT
	0	CONTINUE AFTER ERROR REPORT
SW9	1	WAIT FOR INTERRUPTS USING WAIT INSTRUCTION
	0	WAIT FOR INTERRUPTS WITH BACKGROUND TEST
SW8	1	LOOP ON DISK ADDRESS (SPECIFIED BY WORD COUNT AND DAR)
	0	CONTINUE TO NEXT DISK BUFFER AREA.
SW5	1	SELECT TRACK FROM SW (SEE NOTE 5.1.1)
	0	SELECT TRACK UNDER PROGRAM CONTROL

TRACK SELECTION

4	3	2	1	0

SELECT ONE OF 37(8) TRACKS

5.1.1 ROUTINE TO SETUP CYLINDER NUMBER FROM SWR

WHEN USING THIS OPTION, CARE MUST BE TAKEN IN THAT WHEN ACCESSING TRACK ADDRESS 37, THE STANDARD WORK COUNT (SWRDCT) SHOULD NOT EXCEED 4000 (8) FOR A NON-EXISTANT DRIVE ERROR WILL OCCUR.

DESCRIPTION

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?(YES-NO)

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

MULTI DRIVE MODE? (YES-NO)

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 ANSERS "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 ANSERS "NO" TO THIS QUESTION, THE NEXT QUESTION WILL BE SKIPPED, AND HE WILL THEN BE ASKED WHICH DISK IS TO BE EXERCISED.

NUMBER OF DRIVES(1 - 4)?

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

EXERCISE DRIVE?

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

OPTIONAL WORD COUNT(YES-NO)

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

LENGTH (1 TO N)?

THE OPERATOR CAN SPECIFY ANY LENGTH TRANSFER FROM 1(8) TO N(8) WORDS. THE NORMAL TRANSFER LENGTH IS N(8) WORDS WHERE N IS THE MAXIMUM BUFFER SIZE FOR THE AVAILABLE CORE.

STARTING SECTOR?

THE OPERATOR CAN SPECIFY THE STARTING SECTOR (0-77). THIS

269 SHOULD BE USED IN CONJUNCTION WITH SWITCHES 8 AND 0-5.

DESCRIPTION

DATA PATTERN NO.?

IF NO OPTIONAL DATA PATTERN IS REQUESTED (#22) 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

IN THIS SECTION OF THE PROGRAM PARAMETER CONVERSATION MODE, THE OPERATOR CAN SELECT ANY ONE 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 KNOW DATA ON THE DISK. THIS COURSE OF ACTION ALSO PREVAILS FOR A READ ONLY OPERATION.
* IF AND 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 A CARRIAGE-RETURN SHOULD BE TYPED AT THE INDICATED PLACE TO TERMINATE THE LINE OF TYPED CHARACTERS.

5.3 ROUTINE ABSTRACTS

ADDRESS TEST

RANEX - RANDOM DATA, RANDOM ADDRESS RANDOM WORD COUNT TEST

THIS ROUTINE 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 N(8) WORDS. WHERE N IS DESCRIBED IN 5.2.

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)

DESCRIPTION

ROUTINES IN DATA TEST

600	JMP	ADT1	TRACK AND SECTOR SELECT TEST
604	JMP	ADT3	WRITE EACH WORD ADDR ON ITSELF AND READ BACK TO COMPARE
610	JMP	RANEX	RANDOM ADDRESS, DATA AND WORD COUNT TEST
614	JMP	TKSEL	ONE WORD READ TEST TO SELECTED TRACK

POWER FAIL ROUTINES ***DATA TEST ONLY***

650	JMP	PFT1	DISK WRITE POWER FAIL TEST
654	JMP	PFT2	DISK WRITE CHECK POWER FAIL TEST

6. ERROR REPORTS

6.1 STATIC AND ADDRESS REPORT.

ERROR XXX XXXXXX XXXXXX
A B C

A= IS THE TAG FOR THE LISTING
B= WHAT WAS EXPECTED (WORK1) OPTIONAL
C= WHAT WAS RECEIVED (WORK)

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 XXXXXX RCER XXXXXX RCDA XXXXXX RCCS
A B C

A= DISK ERROR REGISTER
B= DISK ADDRESS REGISTER
C= DISK CONTROL REGISTER

BIT LAYOUT OF DAE REGISTER

BIT15= ERROR
BIT14= DATA ERROR
BIT13= ADDRESS ERROR
BIT12= WRITE LOACK ERROR
BIT11= NON-EXISTENT DISK
BIT10= WRITE CHECK ERROR
BIT9= INHIBIT INCREMENTING CA
BIT8= ABORT
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	LOOK AHEAD
1	0	READ
0	1	WRITE
1	1	WRITE CHECK

BIT0= GO (WRITE ONLY BIT).

NOTE: IF AN ERROR OCURRS, THE FOLLOWING INFORMATION IS AVAILABLE TO THE USER IN THE DAE:

BIT4=	ADDRESS NOT FOUND
BIT5=	DISK OVERFLOW
BIT6=	ADDRESS SYNC. ERROR
BIT7=	ADDRESS PARITY ERROR
BIT8=	B TRACK ERROR
BIT9=	A TRACK ERROR
BIT12=	NONEXISTENT MEMORY
BIT13=	DATA SYNC. ERROR
BIT14=	BLOCK CHECK ERROR
BIT15=	DATA LATE

6.3 DATA ERRORS

DATA ERROR XXX READ XXXXXX RCDA XX WORD ADR. XXXXXX XXXXXX
A B C D E

A= WHICH READ THE ERROR OCCURRED
B= THE DISK ADDRESS REGISTER
C= WORD ADDRESS (0-37
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 ERROR XXXXXX RCDA XXXXXX WORD COUNT.
A B

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

6.5 DISK ADDRESS ERROR

DRIVE ADDRESS ERROR XXXXXX DMA XXXXXX RCDA
A B

A= TRUE DISK ADDRESS
B= DISK ADDRESS FOUND

THE TERMINATING DISK ADDRESS AFTER THE TRANSFER WAS NOT CORRECT. THE RCDA SHOULD EQUAL WHAT WAS REPORTED.

6.6 PROCESSOR TIME OUT

PROCESSOR BACKGROUND TIMED OUT

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

6.7 END

END

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

6.8 PARITY

THIS MESSAGE IS REPORTED IF THE PROGRAM DETECTS A MEMORY PARITY ERROR DURING EXECUTION.

7. MISCELLANEOUS

IN SOME ADDRESS TESTS THE PROGRAM DEPENDS 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.

7.1 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) RUN TEST FROM 200 FOR 1 PASS.

B) LOAD AND START PFT1

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

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

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

8. RUNTIME

8.1 TYPEOUT WILL OCCUR WITHIN 15 MIN. WITH 8K OF MEMORY.

```
                                %
                        .TITLE  MAINDEC-11-DZRCB-B      RC11 DATA TEST  REPLACES D5JA-PB2/DZRCB-A
                        ;COPYRIGHT 1971, 1972, DIGITAL EQUIPMENT CORP.,MAYNARD,MASS.
                        ;PROGRAM BY BOB BRAIN/C. CASWELL

                        .REM*


                                SWITCH          REASON
                                ------          ------

                                  15            ENTER CONVERSATION MODE
                                  14            INHIBIT TYPEOUTS
                                  13            HALT ON COMPLETION
                                  12            INHIBIT COMPARISON
                                  11            LOOP ON TEST
                                  10            HALT ON ERROR
                                   9            BACKGROUND TEST
                                   8            LOOP ON DISK ADDRESS
                                   5            SELECT TRACK NUMBER
                                 4 - 0          TRACKS 0 - 37*


                        .ENABL  ABS
                        N=      1
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

104403                  WRITE=TRAP+3
104407                  WRCHECK=TRAP+7
104405                  READ=TRAP+5
```

```
                000008                  .=      0                       ;TRAP CATCHER 0 - 776
                000200                  .=      200
000200  000167  000716                  JMP     START
                000600                  .=600
000600  000167  001444                          JMP     ADT1            ;TRACK AND SECTOR SELECT TEST
000604  000167  001754                          JMP     ADT3            ;WRITE EACH WORD ADDR ON ITSELF AND
                                                                        ;READ BACK TO COMPARE

000610  000167  002356                          JMP     RANEX           ;RANDOM ADDRESS, DATA AND
                                                                        ;WORD COUNT TEST
000614  000167  005444                          JMP     TkSEL           ;ENABLES OPERATOR TO SELECT TRACKS DYNAMICLY

                000650                  .=650
000650  000167  006436                          JMP     PFT1            ;DISK WRITE POWER FAIL TEST
000654  000167  006666                          JMP     PFT2            ;DISK WRITE CHECK POWER FAIL TEST

                                        ;RC11 DATA TEST
                                        ;VECTORS USED IN PROGRAM
                                        ;#1 LOC 210 DISK INTERRUPT
                                        ;#2 LOC 30 EMT (TELETYPE OUTPUT)
                                        ;#3 LOC 34 TRAP (DISK HANDLERS)
                                        ;#4 LOC 14 TRACE TRAP (USED IN BACKGROUND TEST)
                                        ;#5 LOC 20 IOT TRAP (USED IN CALLING BACKGROUND TEST)

                001000                  .=      1000
```

```
                                ;I/O ADDRESS POINTERS
                                
001000  177570                  SWR:    177570          ;SWITCH REGIISTER
001002  177776                  PS:     177776          ;PROCESSOR STATUS REGISTER
001004  177566                  TPB:    177566          ;TELETYPE REGISTERS
001006  177562                  TKB:    177562
001010  177564                  TPS:    177564
001012  177560                  TKS:    177560
001014  033604                  ODT:    33604

                                ;DISK I/O REGISTERS

001016  177440                  RCLA:   177440          ;LOOK AHEAD
001020  177444                  RCER:   177444          ;DSK STATUS 2
001022  177446                  RCCS:   177446          ;DSK STATUS 1
001024  177450                  RCWC:   177450          ;WORD COUNT
001026  177452                  RCBA:   177452          ;CURRENT TRANSFER ADDRESS
001030  177442                  RCDA:   177442          ;DSK ADDRESS
001032  177454                  RCMR:   177454          ;MAINTENANCE
001034  177456                  RCDB:   177456          ;DATA BUFFER

001036  000210                  VECTOR: 210             ;INTERRUPT VECTOR ADDRESS
001040  000212                  STATUS: 212             ;DISK INTERRUPT STATUS
001042  000200                  PRIORITY:BIT7           ;DISK PRIORITY LEVEL

                                ;RC11 DEDICATE REGISTERS (MEMORY)

001044  000000                  FLAG:   0               ;INTERNAL PROGRAM FLAG
001046  146723                  RANNU:  146723          ;RANDOM NUMBER PRIME
001050  000000                  WRDCT:  0               ;WORKING WORD COUNT
001052  000000                  TRACK:  0               ;WORKING DAE
001054  000000                  DMA:    0               ;WORKING DAR
001056  000000                  PATNU:  0               ;DATA PATTERN INDEX
001060  000000                  BUF:    0               ;WORKING DATA BUFFER (OUT-IN)
001062  000000                  TWRDCT: 0               ;TEMP WORD COUNT
001064  000000                  TDMA:   0               ;TEMP DAR
001066  000000                  SWRDCT: 0               ;STANDARD WORD COUNT
001070  000000                  ERCOUNT:0               ;ERROR COUNT FOR MESSAGES.
001072  000000                  SAVE:   0
001074  000000                  SAV1:   0
001076  000000                  PASS:   0
001100  000000                  DSKNOR: 0
001102  000000                  HRDER:  0               ;POINTER FOR HARD ERROR
001104  000000                  BLOCK:  0
001106  000000                  PASSC:  0
001110  000000                  INBUF:  0

                                ;RC11 WORK REGISTERS    (CAN BE CHANGED IN ANY ROUTINE)

001112  000000                  WORK:   0
001114  000000                  WORK1:  0
001116  000000                  WORK2:  0
001120  000000                  WORK3:  0
```

```
  671  001122  000005                    START:  RESET                   ;CLEAR THE WORLD
  672  001124  012767  000004  177760            MOV     #4,WORK
  673  001132  012700  010272            CLRTAB: MOV     #TABLE,%0       ;CLEAR ERROR TABLE
  674  001136  005020                            CLR     (0)+
  675  001140  005367  177746                    DEC     WORK
  676  001144  001372                            BNE     CLRTAB
  677  001146  012706  001000                    MOV     #1000,%6        ;SET UP STACK
  678  001152  004567  004504                    JSR     %5,EXTMEN       ;SET UP DATA BUFFERS
  679  001156  012706  001000                    MOV     #1000,%6        ;RESET STACK
  680  001162  012767  006550  176640            MOV     #EMTRP,30       ;SET UP TTY POINTER
  681  001170  012767  000340  176634            MOV     #340,32         ;LOCK UP INTERRUPTS
  682  001176  012767  003674  176630            MOV     #DISK,34        ;SET UP DISK HANDLER POINTER
  683  001204  012767  000340  176624            MOV     #340,36         ;LOCK UP INTERRRUPTS
  684  001212  012777  000340  177562            MOV     #340,@PS        ;LOCK UP INTERRUPT LEVELS
  685  001220  012767  006134  176572            MOV     #XWAIT,20
  686  001226  005067  176570                    CLR     22
  687  001232  012767  007470  176564            MOV     #DOWN,24        ;SET UP PWR FAIL
  688  001240  012767  000340  176560            MOV     #340,26         ;LOCK UP INTERRUPTS
  689  001246  005067  177572                    CLR     FLAG            ;CLEAR PROGRAM FLAG
  690  001252  005067  177576                    CLR     DMA             ;CLEAR DAR REGISTERS
  691  001256  005067  177574                    CLR     PATNU           ;CLEAR PATTER COUNT
  692  001262  016767  177600  177560            MOV     SWRDCT,WRDCT
  693  001270  004767  006576                    JSR     7,MAMF          ;SET PARITY SWITCHES
  694  001274  005777  177500                    TST     @SWR
  695  001300  100464                            BMI     LCONM           ;OPERATE UNDER PROGRAM CONTROL
  696  001302  052767  070000  177534            BIS     #70000,FLAG
  697  001310  005067  006766                    CLR     TEXBUF
  698  001314  032777  004000  177500  SPECOR: BIT     #BIT11,@RCCS    ;TEST FOR DISK
  699  001322  001013                            BNE     RCNODV          ;NO DEVICE!
  700  001324  022767  000004  006750            CMP     #4,TEXBUF       ;TESTED FOR ALL DEVICES?
  701  001332  001407                            BEQ     RCNODV          ;REPORT NUMBER
  702  001334  062767  000001  006740            ADD     #1,TEXBUF       ;INC DEVICE COUNT
  703  001342  062777  004000  177460            ADD     #4000,@RCDA     ;ADDRESS NEXT DISK
  704  001350  000761                            BR      SPECOR
  705  001352  005767  006724            RCNODV: TST     TEXBUF          ;TEST FOR 0 DEVICES
  706  001356  001003                            BNE     REPDRV
  707  001360  104001                            EMT+1                   ;REPORT 0 DEVICES
  708  001362  011352                            NODRV
  709  001364  000000                            HALT
  710  001366  004567  005426            REPDRV: JSR     %5,CONV         ;CONVERT TO ASCII FOR PRINT
  711  001372  010302                            TEXBUF
  712  001374  011377                            RKNUM
  713  001376  000001                            1                       ;TYPE NUMBER OF DRIVES
  714  001400  104000                            EMT     +0
  715  001402  010370                            HEDSA
  716  001404  011377                            RKNUM
  717  001406  177777                            -1
  718  001410  016767  006666  177462            MOV     TEXBUF,DSKNOR   ;SAVE # OF DISKS
  719  001416  162767  000001  177454            SUB     #1,DSKNOR       ;FIRST DISK IS ZERO
  720  001424  006167  177450                    ROL     DSKNOR          ;SHIFT LEFT TO MATCH FLAG
  721  001430  006167  177444                    ROL     DSKNOR          ;POSITION
  722  001434  052767  004000  177402            BIS     #BIT11,FLAG     ;SET UP PROGRAM FLAG
  723  001442  005077  177362                    CLR     @RCDA           ;RESET DISK ADDRESS
  724  001446  000167  000504                    JMP     ADTST
  725
  726                                    ;ENTER OPERATOR CONVERSATION MODE
```

```
  727
  728  001452                          LCONM:
  729  001452  104001                 CONM:   EMT     +1              ;ASK ABOUT DATA TEST ONLY
  730  001454  010751                         CON1
  731  001456  004767  005430                JSR     %7,ALPHA        ;GO WAIT FOR ANSWER
  732  001462  022767  000153  006612        CMP     #153,TEXBUF     ;TEST FOR YES
  733  001470  001003                        BNE     .+10            ;BRANCH IF NO
  734  001472  052767  002000  177344        BIS     #BIT10,FLAG
  735  001500  104001                        EMT     +1
  736  001502  011003                        CON2                    ;ASK ABOUT MULTI DRIVE MODE
  737  001504  004767  005402                JSR     %7,ALPHA        ;GO WAIT FOR ANSWER
  738  001510  022767  000153  006564        CMP     #153,TEXBUF     ;TEST FOR YES
  739  001516  001026                        BNE     DATTES          ;
  740  001520  052767  004000  177316        BIS     #BIT11,FLAG     ;
  741  001526  104001                 DSKDR:  EMT     +1
  742  001530  011036                         CON3
  743  001532  004767  005344                JSR     %7,NOCHA
  744  001536  162767  000001  006536        SUB     #1,TEXBUF
  745  001544  022767  000004  006530        CMP     #4,TEXBUF
  746  001552  101765                        BLOS    DSKDR
  747  001554  016767  006522  177316        MOV     TEXBUF,DSKNOR
  748  001562  006167  177312                ROL     DSKNOR
  749  001566  006167  177306                ROL     DSKNOR
  750  001572  000420                        BR      ASKWC
```

```
  751  001574  104001                    DATTES: EMT     +1
  752  001576  011072                            CON4                    ;ASK UNIT NUMBER
  753  001600  004767  005276                    JSR     %7,NOCHA        ;WAIT FOR NO.
  754  001604  022767  000004  006470            CMP     #4,TEXBUF       ;IS NO = OR>4
  755  001612  101770                            BLOS    DATTES          ;NO
  756  001614  000241                            CLC
  757  001616  006167  006460                    ROL     TEXBUF
  758  001622  006167  006454                    ROL     TEXBUF
  759  001626  056767  006450  177210            BIS     TEXBUF,FLAG
  760
  761  001634  104001                    ASKWC:  EMT     +1
  762  001636  011113                            CON5                    ;ASK ABOUT OPTIONAL WORD COUNT
  763  001640  004767  005246                    JSR     %7,ALPHA        ;WAIT FOR ANSWER
  764  001644  022767  000153  006430            CMP     #153,TEXBUF
  765  001652  001050                            BNE     OPPAT           ;ASK ABOUT OPTIONAL DAR
  766
  767  001654  104001                    WCCON:  EMT     +1
  768  001656  011151                            CON6                    ;ASK LENGTH OF WC
  769  001660  004567  005134                    JSR     %5,CONV
  770  001664  001066                            SWRDCT
  771  001666  011170                            CON6A
  772  001670  000006                            6
  773  001672  104001                            EMT+1
  774  001674  011170                            CON6A
  775  001676  004767  005200                    JSR     %7,NOCHA
  776  001702  005767  006374                    TST     TEXBUF
  777  001706  001762                            BEQ     WCCON
  778  001710  016767  177152  177174            MOV     SWRDCT,WORK
  779  001716  005267  177170                    INC     WORK
  780  001722  026767  177164  006352            CMP     WORK,TEXBUF     ;IS TEXBUF LESSTHAN SWRDCT
  781  001730  101751                            BLOS    WCCON           ;YES ASK FOR COUNT AGAIN
  782  001732  016767  006344  177126            MOV     TEXBUF,SWRDCT   ;OPERATING WORD COUNT
  783  001740  016767  177122  177102            MOV     SWRDCT,WRDCT
  784
  785  001746  104001                    OPDAR:  EMT     +1
  786  001750  011201                            CON7                    ;ASK ABOUT OPTIONAL DAR
  787  001752  004767  005124                    JSR     %7,NOCHA
  788  001756  022767  000100  006316            CMP     #100,TEXBUF     ;77 MAX SECTOR COUNT
  789  001764  101770                            BLOS    OPDAR
  790  001766  016767  006310  177060            MOV     TEXBUF, DMA     ;TEMP SECTOR REGISTER
```

```
                                                OPPAT:  EMT     +1
                                                        CONB                    ;ASK ABOUT DATA PATTERNS
                                                        JSR     %7,NOCHA
                                                        CMP     #23,TEXBUF      ;TEST FOR CORRECT NO
                                                        BLOS    OPPAT           ;ASK AGAIN
                                                        CMP     #22,TEXBUF
                                                        BEQ     OPWRT           ;DATA PATTERN UNDER PROGRAM CONTROL
                                                        BIS     #BIT15,FLAG     ;SET PROGRAM FLAG
                                                        MOV     TEXBUF, PATNU   ;OPERATOR WANTS TO SELECT DATA
                                                        CLC
                                                        ROL     PATNU
                                                        BIC     #70000,FLAG     ;CLEAR OP MODE BITS IN FLAG

                                                OPWRT:  EMT     +1
                                                        CON9                    ;ASK ABOUT WRITE
                                                        JSR     %7,ALPHA
                                                        CMP     #153,TEXBUF     ;TEST FOR YES
                                                        BNE     OPRD            ;ASK ABOUT WRITE CHECK
                                                        BIS     #BIT14,FLAG     ;YES SET FLAG BIT

                                                OPRD:   EMT     +1
                                                        CON11                   ;ASK ABOUT READ
                                                        JSR     %7,ALPHA
                                                        CMP     #153,TEXBUF     ;TEST FOR YES ANSWER
                                                        BNE     OPWCK
                                                        BIS     #BIT12,FLAG     ;SET FLAG TO READ

                                                OPWCK:  EMT+1
                                                        CON10                   ;ASK ABOUT WRITE CHECK
                                                        JSR     %7,ALPHA
                                                        CMP     #153,TEXBUF
                                                        BNE     ADTST
                                                        BIS     #BIT13,FLAG

                                                ADTST:  BIT     #BIT11,FLAG     ;ARE WE IN MULTI DRIVE MODE
                                                        BEQ     EXMFLG          ;BRANCH IF NO.
                                                        EMT     +1
                                                        MES11
                                                        MOV     FLAG,ACNVX
                                                        POR     ACNVX
                                                        ROR     ACNVX
                                                        BIC     #177774,ACNVX   ;FETCH DRIVE #
                                                        JSR     %5,CONV
                                                        ACNVX
                                                        MES12
                                                        1
                                                        EMT     +1
                                                        MES12
                                                EXMFLG: BIT     #BIT10,FLAG     ;TEST FOR DATA TEST ONLY
                                                        BEQ     .+6             ;DO COMPLETE TEST
                                                        JMP     DATAT           ;DO DATA TEST ONLY
```

```
                                        ;***** ADDRESS TEST *****
                                        ;
                                        ;RC11 ADDRESS TEST #1 (TRACK AND SECTOR SELECTION TEST)
                                        ;
                                        ;WRITE 40(OCTAL) WORDS IN EACH SECTOR
                                        ;THE WORD CONTAINS THE ADDRESS OF EACH SECTOR
                                        ;WHEN THE COMPLETE DISK IS WRITTEN READ
                                        ;BACK EACH SECTOR AND COMPARE FOR THE CORRECT
                                        ;DATA IN THE SECTOR
                                        ;
002250  016767  176612  176614  ADT1:   MOV     SWRDCT,SAVE
002256  004567  002502                  JSR     %5,DSKNOS       ;SET UP DISK NUMBER
002262  012767  000040  176576          MOV     #40,SWRDCT
002270  012767  000040  176552          MOV     #40,WRDCT       ;SETUP WORD COUNT
002276  012767  011432  176554          MOV     #OUTBUF,BUF     ;SET UP CURRENT ADDRESS
002304  012706  001000                  MOV     #1000,%6        ;SET UP STACK
002310  005067  176540                  CLR     DMA
002314  012700  011432          SEABUF: MOV     #OUTBUF,%0      ;SET UP ADDRESS BUFFER
002320  016701  176524                  MOV     WRDCT,%1        ;
002324  016720  176524          XSEABUF:MOV     DMA,(0)+
002330  005301                          DEC     %1
002332  001374                          BNE     XSEABUF
002334  104403                          WRITE                   ;WRITE SECTOR
002336  105777  176460                  TSTB    @RCCS           ;CHECK FOR READY
002342  100375                          BPL     .-4
002344  005777  176452                  TST     @RCCS           ;TEST FOR ERROR
002350  100011                          BPL     WRNEXB          ;BRANCH IF NO ERROR
002352  012767  000001  176510  ER1:    MOV     #1,ERCOUNT      ; ****** ERROR 1 ******
002360  017767  176436  176524          MOV     @RCCS,WORK      ;FETCH CONTENTS OF CONTROL REG
002366  004567  004024          ERR1:   JSR     %5,STAER        ;REPORT ERROR
002372  000750                          BR      SEABUF          ;LOOP ON ERROR
002374  004767  002012          WRNEXB: JSR     %7,DISBUF       ;SET UP NEXT DISK ADDR.
002400  000745                          BR      SEABUF          ;WRITE NEXT SECTOR
002402  005067  176446                  CLR     DMA
002406  016767  176476  176444  SETADT: MOV     INBUF,BUF       ;SET UP CURRENT ADDRESS
```

```
  877  002414  104405                  RDSECT: READ
  878  002416  105777  176400                  TSTB    @RCCS           ;CHECK FOR READY
  879  002422  100375                          BPL     .-4             ;NOT READY BRANCH BACK
  880  002424  005777  176372                  TST     @RCCS           ;TEST FOR ERROR
  881  002430  100014                          BPL     ADHGT           ;BRANCH IF NO ERROR
  882  002432  017767  176364  176452          MOV     @RCCS,WORK      ;FETCH CONTROL REG
  883  002440  017767  176364  176446          MOV     @RCDA,WORK1     ;FETCH DISK ADDR
  884  002446  012767  000002  176414  ER2:     MOV     #2,ERCOUNT      ; ****** ERROR 2 ******
  885  002454  004567  004000          ERR2:   JSR     %5,STAER1       ;REPORT ERROR
  886  002460  000755                          BR      RDSECT          ;LOOP ON ERROR
  887  002462  016700  176422          ADHGT:  MOV     INBUF,%0
  888  002466  012701  000040                  MOV     #40,%1
  889  002472  026710  176356          SANHT:  CMP     DMA,(0)         ;CMP FOR CORRECT ADDR.
  890  002476  001004                          BNE     ADERR           ;BRANCH IF DATA DID NOT COMPARE
  891  002500  005720                  INCADT: TST     (0)+
  892  002502  005301                          DEC     %1
  893  002504  001372                          BNE     SANHT           ;TEST NEXT WORD
  894  002506  000412                          BR      CHKADT
  895  002510  016767  176340  176376  ADERR:  MOV     DMA,WORK1       ;CORRECT ADDRESS
  896  002516  011067  176370                  MOV     (0),WORK        ;DATA IN ERROR
  897  002522  012767  000003  176340  ER3:     MOV     #3,ERCOUNT      ; ****** ERROR 3 ******
  898  002530  004567  003724          ERR3:   JSR     %5,STAER1       ;REPORT ERROR
  899
  900                                  ;*****REPORT ONLY ONE ERROR PER SECTOR*****
  901
  902  002534  004767  001652          CHKADT: JSR     %7,DISBUF       ;SET UP NEXT DISK BUFFER
  903  002540  000725                          BR      RDSECT          ;CHECK NEXT SECTOR
  904  002542  016767  176324  176316          MOV     SAVE,SWRDCT     ;RESTORE STANDARD WORD COUNT
  905  002550  032777  004000  176222          BIT     #BIT11,@SWR     ;DOES OPERATOR WANT TO LOOP ON TEST
  906  002556  001402                          BEQ     .+6
  907  002560  000167  177464                  JMP     ADT1
```

```
  908  002564  005067  176264          ADT3:   CLR     DMA
  909
  910  002570  016767  176272  176252  DATAT:  MOV     SWRDCT,WRDCT
  911  002576  012777  003776  176232          MOV     #DKINT,@VECTOR
  912  002604  012777  000340  176226          MOV     #340,@STATUS
  913  002612  012767  002632  176262          MOV     #LDAT,HRDER     ;SETUP FOR HARD ERROR
  914  002620  012777  000340  176154          MOV     #340,@PS        ;LOCK UP PROCESSOR PRIORITY
  915  002626  004567  002270                  JSR     %5,PASEL        ;SET UP DATA BUFFERS
  916  002632  004567  001464          LDAT:   JSR     %5,OPDSEL       ;SET UP DISK ADDRESS
  917  002636  032767  040000  176200          BIT     #BIT14,FLAG     ;TEST FOR WRITE
  918  002644  001421                          BEQ     ESH             ;TEST FOR READ
  919  002646  012767  011432  176204          MOV     #OUTBUF,BUF     ;SETUP OUTPUT BUFFER
  920  002654  104503                          WRITE   +100            ;WRITE WITH INT. ENABLED
  921  002656  032777  001000  176114          BIT     #BIT9,@SWR      ;FIND OUT HOW TO WAIT FOR INT
  922  002664  001002                          BNE     WRWAIT          ;WAIT WITH WAIT INSTRUCTION
  923  002666  000004                          IOT                     ;WAIT IN BACKGROUND TEST
  924  002670  000404                          BR      XSLH
  925  002672  016777  176144  176102  WRWAIT: MOV     PRIORITY,@PS
  926  002700  000001                          WAIT                    ;WAIT FOR FLAG
  927  002702  004767  001504          XSLH:   JSR     %7,DISBUF       ;SET BUFFER FOR WRITE
  928  002706  000751                          BR      LDAT
  929  002710  004567  001406          ESH:    JSR     %5,OPDSEL       ;OPERATOR SELECTED CYLINDER?
  930  002714  032767  010000  176122          BIT     #BIT12,FLAG     ;TEST FOR READ
  931  002722  001451                          BEQ     SLH
  932  002724  016767  176160  176126          MOV     INBUF,BUF       ;SETUP OUTPUT BUFFER
  933  002732  042767  000003  176104          BIC     #3,FLAG         ;CLEAR RE-READ COUNT
```

```
  934  002740  012777  000340  176034  DSKRD:  MOV     #340,@PS
  935  002746  005267  176072                  INC     FLAG
  936  002752  104505                          READ    +100            ;READ + INT ENABLE
  937  002754  032777  001000  176016          BIT     #BIT9,@SWR      ;FIND OUT HOW TO WAIT FOR INT.
  938  002762  001002                          BNE     RDWAIT          ;WAIT WITH WAIT INSTRUCTION
  939  002764  000004                          IOT
  940  002766  000404                          BR      ELH
  941  002770  016777  176046  176004  RDWAIT: MOV     PRIORITY,@PS    ;SET UP PRIORITY
  942  002776  000001                          WAIT                    ;WAIT FOR FLAG
  943  003000  032777  010000  175772  ELH:    BIT     #BIT12,@SWR
  944  003006  001002                          BNE     ADRD
  945  003010  004567  002342                  JSR     %5,COMPARE      ;COMPARE OUTBUFFER TO INBUFFER
  946  003014  016767  176024  176070  ADRD:   MOV     FLAG,WORK       ;CHECK DISK RE-READ COUNT
  947  003022  042767  177774  176062          BIC     #177774,WORK    ;DO 3 RE-READS.
  948  003030  022767  000003  176054          CMP     #3,WORK
  949  003036  001340                          BNE     DSKRD           ;DO ANOTHER RE-READ
  950  003040  004767  001346                  JSR     %7,DISBUF       ;GO SET UP DISK BUFFER.
  951  003044  000721                          BR      ESH
  952  003046  004567  001250          SLH:    JSR     %5,OPDSEL       ;IS THE OPERATOR SELECTING THE TRACK
  953  003052  032767  020000  175764          BIT     #BIT13,FLAG     ;TEST FOR WRITE CHECK
  954  003060  001424                          BEQ     MSTR
  955  003062  012767  011432  175770          MOV     #OUTBUF,BUF     ;SET UP CURRENT ADDRESS
  956  003070  012777  000340  175704          MOV     #340,@PS
  957  003076  104507                  WRCHECK +100
  958  003100  032777  001000  175672          BIT     #BIT9,@SWR
  959  003106  001002                          BNE     WCWAIT          ;WAIT FOR FLAG IN WAIT INST.
  960  003110  000004                          IOT                     ;WAIT FOR FLAG IN BACKGROUND TEST
  961  003112  000404                          BR      XESH
  962  003114  016777  175722  175660  WCWAIT: MOV     PRIORITY,@PS
  963  003122  000001                          WAIT                    ;WAIT FOR THE FLAG
  964  003124  004767  001262          XESH:   JSR     %7,DISBUF       ;SET UP THE DISK BUFFER
  965  003130  000746                          BR      SLH
  966  003132  005767  175706          MSTR:   TST     FLAG
  967  003136  100002                          BPL     .+6             ;UNDER PROGRAM CONTROL
  968  003140  000167  000374                  JMP     EXTPPR          ;OPERATOR SELECTED PATTERN
  969  003144  062767  000002  175704          ADD     #2,PATNU        ;INC PATTERN INDEX
  970  003152  022767  000044  175676          CMP     #44,PATNU
  971  003160  001402                          BEQ     .+6
  972  003162  000167  177402                  JMP     DATAT           ;NOT LAST PATTERN EXIT
  973  003166  005067  175664                  CLR     PATNU           ;LAST PATTERN EXIT
```

```
                                        ;THIS IS A RANDOM ADDRESS RANDOM DATA TEST
                                        
003172  012706  001000          RANEX:  MOV     #1000,%6
003176  012767  177000  175702          MOV     #-1000,PASSC    ;SET UP PASS COUNT
003204  042767  001000  175632          BIC     #BIT9,FLAG      ;CLR ERROR FLAG BIT
003212  012767  003442  175662          MOV     #RANER,HRDER    ;SET UP FOR HARD ERROR
003220  012777  003776  175610          MOV     #DKINT,@VECTOR  ;SET UP INTERRUPT VECTOR
003226  012777  000340  175604          MOV     #340,@STATUS
003234  016777  175602  175540          MOV     PRIORITY,@PS    ;SET PRIORITY TO LEVEL 5
003242  012767  000001  175642  WRLG:   MOV     #1,WORK         ;SET UP RANDOM GENERATOR WORD
003250  012701  011432                  MOV     #OUTBUF,%1
003254  004567  001702                  JSR     %5,RANDOM       ;GENERATE RANDOM DATA
003260  016767  006146  175566          MOV     OUTBUF,DMA      ;SET UP DISK ADDRESS
003266  042767  174000  175560          BIC     #174000,DMA
003274  012767  000040  175546          MOV     #40,WRDCT       ;SET UP WORD COUNT =1SECTOR
003302  016767  175542  175602          MOV     WRDCT,WORK      ;GENERATE RANDOM BUFFER
003310  012701  011432                  MOV     #OUTBUF,%1
003314  004567  001642                  JSR     %5,RANDOM
003320  012767  011432  175532          MOV     #OUTBUF,BUF     ;SET UP OUTPUT BUFFER
003326  104503                          WRITE   +100    ;
003330  032777  001000  175442          BIT     #BIT9,@SWR
003336  001002                          BNE     .+6
003340  000004                          IOT
003342  000404                          BR      .+12
003344  016777  175472  175430          MOV     PRIORITY,@PS    ;LOCK UP CPU
003352  000001                          WAIT
003354  104507                          WRCHECK +100            ;WRITE CHECK THE DISK
003356  032777  001000  175414          BIT     #BIT9,@SWR
003364  001002                          BNE     .+6
003366  000004                          IOT
003370  000404                          BR      .+12
003372  016777  175444  175402          MOV     PRIORITY,@PS
003400  000001                          WAIT
003402  016767  175502  175450          MOV     INBUF,BUF
003410  104505                          READ    +100
003412  032777  001000  175360          BIT     #BIT9,@SWR
003420  001002                          BNE     .+6
003422  000004                          IOT
003424  000404                          BR      .+12
003426  016777  175410  175346          MOV     PRIORITY,@PS
003434  000001                          WAIT
003436  004567  001714                  JSR     %5,COMPARE      ;COMPARE THE DATA FOR ERRORS
```

```
1016  003442  032767  001000  175374  RANER:  BIT     #BIT9,FLAG      ;TEST FOR ERRORS
1017  003450  001422                          BEQ     EXRAX           ;NO ERRORS
1018  003452  042767  001000  175364          BIC     #BIT9,FLAG
1019  003460  004567  003334                  JSR     %5,CONV         ;SET UP FOR ADDRESS REPORT
1020  003464  001054                          DMA
1021  003466  010435                          MES1
1022  003470  000006                          6
1023  003472  004567  003322                  JSR     %5,CONV         ;SET UP WORD COUNT FOR REPORT
1024  003476  001050                          WRDCT
1025  003500  010521                          MES3
1026  003502  000006                          6
1027  003504  104000                          EMT+0
1028  003506  010403                          HED6
1029  003510  010435                          MES1
1030  003512  010521                          MES3
1031  003514  177777                          -1
1032  003516  005267  175364          EXRAX:  INC PASSC                ;+1 PASS COUNT
1033  003522  001247                          BNE     WRLG            ;BRANCH IF TEST NNT OVER
1034  003524  032777  004000  175246          BIT     #BIT11,@SWR     ;LOOP ON TEST
1035  003532  001402                          BEQ     .+6
1036  003534  000167  177432                  JMP     RANEX           ;YES LOOP ON TEST
```

```
1037                                    ;CHECK FOR MULTI DISK MODE
1038                                    ;IF IN MULTI DISK MODE REPORT "END"
1039                                    ;IF LAST DISK ON SYSTEM HAS BEEN
1040                                    ;EXERCISED.
1041
1042  003540  005067  175310       EXTPPR: CLR     DMA
1043  003544  032767  004000  175272       BIT     #BIT11,FLAG     ;ARE WE IN MULTI DISK MODE
1044  003552  001432                      BEQ     REPOEN          ;REPORT "END"
1045  003554  016767  175264  175330 CHKDOS: MOV     FLAG,WORK       ;WHAT DISK ARE WE ON
1046  003562  042767  177763  175322       BIC     #177763,WORK    ;IF LAST DISK ON SYSTEM
1047  003570  026767  175316  175302       CMP     WORK,DSKNOR     ;REPORT END
1048  003576  001420                      BEQ     REPOEN
1049  003600  016703  175306              MOV     WORK,%3         ;SET UP INDEX POINTER
1050  003604  000241                      CLC
1051  003606  006003                      ROR     %3              ;NORMALIZE
1052  003610  022763  000020  010272       CMP     #20,TABLE(3)    ;WHAT IS ERROR COUNT
1053  003616  101004                      BHI     DRVEROK         ;LESS THAN 20(8)-CONTINUE
1054  003620  062767  000004  175216       ADD     #4,FLAG         ;INC. DISK NO.
1055  003626  000752                      BR      CHKDOS
1056  003630  062767  000004  175206 DRVEROK: ADD     #4,FLAG         ;INC. DISK NO.
1057  003636  000414                      BR      EXTPP           ;EXERCISE DISK
1058  003640  104001              REPOEN: EMT     +1
1059  003642  011423                      END                     ;REPORT END OF PASS
1060  003644  042767  000014  175172       BIC     #14,FLAG
1061  003652  013700  000042              MOV     @#42,%0         ;GET MONITOR ADDRESS
1062  003656  001404                      BEQ     EXTPP           ;SKIP IF NO HOOK
1063  003660  004710              LOGICAL: JSR     7,(0)           ;GO TO MONITOR
1064  003662  000240                      NOP
1065  003664  000240                      NOP
1066  003666  000240                      NOP
1067  003670  000167  176262       EXTPP:  JMP     ADTST           ;RECYCLE
1068
1069
1070                                    ;ENTER DISK HANDLER BY THE TRAP INSTRUCTION
1071                                    ;ARGUMENT TO TRAP INSTRUCTION IS TWO ORDER
1072                                    ;BYTE OF THE CONTROL REGISTER.
1073
1074  003674  012705  001030       DISK:   MOV     #RCDA,%5        ;SET UP TO LOAD DISK REG
1075  003700  016775  175150  000000       MOV     DMA,@(5)        ;LOAD WORD ADDRESS
1076  003706  016767  175132  175176       MOV     FLAG,WORK
1077  003714  000367  175172              SWAB    WORK
1078  003720  006167  175166              ROL     WORK
1079  003724  042767  163777  175160       BIC     #163777,WORK
1080  003732  056775  175154  000000       BIS     WORK,@(5)
1081  003740  016755  175114              MOV     BUF,@-(5)       ;SET UP CURRENT ADDRESS
1082  003744  016755  175100              MOV     WRDCT,@-(5)     ;LOAD WORD COUNT
1083  003750  005475  000000              NEG     @(5)            ;SET UP TWO'S COMPLEMENT
1084  003754  011604                      MOV     (6),%4
1085  003756  014467  175130              MOV     -(4),WORK       ;
1086  003762  042767  177600  175122       BIC     #177600,WORK
1087  003770  016755  175116              MOV     WORK,@-(5)      ;LOAD FUNCTION REG.
1088  003774  000002                      RTI                     ;RETURN FROM TRAP
```

```
1089                                        ;RC11 DISK INTERRUPT HANDLER
1090                                        ;ROUTINE CONTINUES ON ERRORS
1091
1092  003776  005046                DKINT:  CLR     -(6)            ;CLEAR STACK
1093  004000  012746  004006               MOV     #1$,-(6)        ;SET RETURN
1094  004004  000002                       RTI                     ;CLEAR T BIT
1095  004006  005777  175010        1$:    TST     @RCCS           ;TEST FOR ERROR
1096  004012  100402                       BMI     .+6
1097  004014  000167  000252               JMP     INTEXT          ;JUMP IF NO ERRORS
1098  004020  004767  004224               JSR     %7,INCTAB       ;INC ERROR COUNT
1099  004024  052767  001000  175012       BIS     #BIT9,FLAG      ;SET ERROR BIT
1100  004032  017767  174762  175052       MOV     @RCER,WORK      ;REPORT ERROR
1101  004040  004567  002754               JSR     %5,CONV         ;CONVERT TO ASCII
1102  004044  001112                       WORK
1103  004046  010452                       MES1A
1104  004050  000006                       6
1105  004052  104001                       EMT+1
1106  004054  010323                       HED2
1107  004056  032777  000002  174736       BIT     #BIT1,@RCCS     ;CHECK FOR READ
1108  004064  001015                       BNE     REDA            ;IF READING REPORT WHICH READ
1109  004066  016767  174752  175016       MOV     FLAG,WORK
1110  004074  042767  177774  175010       BIC     #177774,WORK
1111  004102  004567  002712               JSR     %5,CONV
1112  004106  001112                       WORK
1113  004110  010625                       MES13
1114  004112  000001                       1
1115  004114  104001                       EMT+1
1116  004116  010625                       MES13
```

```
 1117  004120  017767  174704  174764  REDA:   MOV     @RCDA,WORK      ;SET UP 16 BITS OF ADDR.
 1118  004126  004567  002666                  JSR     %5,CONV         ;CONVERT TO ASCII
 1119  004132  001112                          WORK
 1120  004134  010435                          MES1
 1121  004136  000006                          6
 1122  004140  104000                          EMT+0
 1123  004142  010452                          MES1A
 1124  004144  010435                          MES1
 1125  004146  177777                          -1
 1126  004150  017767  174646  174734          MOV     @RCCS,WORK      ;SET UP STATUS
 1127  004156  004567  002636                  JSR     %5,CONV
 1128  004162  001112                          WORK
 1129  004164  010467                          MES2
 1130  004166  000006                          6
 1131  004170  104001                          EMT+1
 1132  004172  010467                          MES2
 1133  004174  032777  040000  174620  CKHRDER:BIT     #BIT14,@RCCS    ;TEST FOR HARD ERROR
 1134  004202  001411                          BEQ     SOFTER          ;GO AND CONTINUE SOFT ERROR
 1135  004204  012706  001000          HRDEXIT:MOV     #1000,%6
 1136  004210  032777  002000  174562          BIT     #BIT10,@SWR     ;HALT ON ERROR
 1137  004216  001401                          BEQ     .+4
 1138  004220  000000                          HALT                    ;YES HALT BIT 10 SET IN SWR
 1139  004222  000177  174654                  JMP     @HRDER          ;EXIT HARD ERROR
```

```
1140  004226  005777  174572          SOFTER: TST     @RCWC           ;CHECK FOR X-FER DONE
1141  004232  001417                          BEQ     INTEXT          ;EXIT FROM ROUTINE
1142  004234  032777  001000  174536          BIT     #BIT9,@SWR
1143  004242  001402                          BEQ     .+6
1144  004244  162716  000002                  SUB     #2,(6)          ;X-FER NOT DONE SET UP FOR RETURN
1145  004250  032777  002000  174522          BIT     #BIT10,@SWR     ;HALT ON ERROR
1146  004256  001401                          BEQ     .+4
1147  004260  000000                          HALT                    ;YES HALT BIT10 SET IN SWR
1148  004262  052777  000001  174532          BIS     #1,@RCCS        ;GO
1149  004270  000002                          RTI                     ;RETURN TO WAIT INSTR.
1150
1151  004272  032777  020000  174500  INTEXT: BIT     #BIT13,@SWR     ;HALT ON COMPLETION FLAG
1152  004300  001401                          BEQ     .+4
1153  004302  000000                          HALT                    ;YES BIT 13 SET IN SWR HALT
1154  004304  032777  001000  174466          BIT     #BIT9,@SWR
1155  004312  001002                          BNE     .+6
1156  004314  012706  000774                  MOV     #774,%6         ;RESET STACK
1157  004320  000002                          RTI                     ;EXIT
1158
1159
1160                                  ;ROUTINE TO SET UP CYLINDER # FROM SWR
1161                                  ;CYLINDER NO. IN SWR 7-0
1162                                  ;ENTER FROM JSR %5, OPDSEL
1163
1164  004322  032777  000040  174450  OPDSEL: BIT     #BIT5,@SWR      ;DOES SWR CONTAIN CYLINDER #
1165  004330  001001                          BNE     .+4
1166  004332  000205                          RTS     %5              ;NO! EXIT
1167  004334  017767  174440  174550          MOV     @SWR,WORK       ;FETCH SWR
1168  004342  042767  177740  174542          BIC     #177740,WORK    ;MASK CYLINDER BITS
1169  004350  000241                          CLC
1170  004352  006167  174534                  ROL     WORK
1171  004356  006167  174530                  ROL     WORK
1172  004362  006167  174524                  ROL     WORK
1173  004366  006167  174520                  ROL     WORK
1174  004372  006167  174514                  ROL     WORK
1175  004376  006167  174510                  ROL     WORK
1176  004402  056767  174504  174444          BIS     WORK,DMA        ;LOAD CYLINDER BITS
1177  004410  000205                          RTS     %5              ;EXIT
```

```
                                        ;ROUTINE TO SETUP DISK BUFFERS
                                        ;ADD WORD COUNT TO STARTING DISK ADDRESSES
                                        ;COMPARE CALCULATED ADDRESS TO TERMINATING ADDRESS

004412  032777  000400  174360  DISBUF: BIT     #BIT8,@SWR
004420  001401                          BEQ     .+4
004422  000207                          RTS     %7
004424  004767  000370                  JSR     %7,BLSZ         ;DEFINE BLOCK SIZE
004430  016767  174450  174456          MOV     BLOCK,WORK1
004436  005267  174412          INCSEC: INC     DMA             ;+1 SECTOR COUNT
004442  022767  004000  174404          CMP     #4000,DMA       ;DONE YET?
004450  001467                          BEQ     BUFEXIT         ;YES
004452  005367  174426          DECBLK: DEC     BLOCK           ;-1 FROM BLOCK COUNT
004456  001401                          BEQ     COMDAR          ;CMP DMA TO RCDA
004460  000766                          BR      INCSEC          ;RECYCLE
004462  016767  174356  174430  COMDAR: MOV     FLAG,WORK3
004470  000367  174424                  SWAB    WORK3
004474  006167  174420                  ROL     WORK3
004500  042767  163777  174412          BIC     #163777,WORK3
004506  066767  174342  174404          ADD     DMA,WORK3
004514  042767  020000  174376          BIC     #20000,WORK3
004522  026777  174372  174300          CMP     WORK3,@RCDA     ;COMPARE LOWER 16 BITS
004530  001434                          BEQ     CMDAE
004532  004567  002262          ERADR:  JSR     %5,CONV         ;CONVERT DMA REG COUNT TO ASCII
004536  001120                          WORK3
004540  010421                          MES0
004542  000006                          6
004544  017767  174260  174340          MOV     @RCDA,WORK
004552  004567  002242                  JSR     %5,CONV
004556  001112                          WORK
004560  010435                          MES1
004562  000006                          6
004564  104000                          EMT     +0              ;REPORT ERROR
004566  010342                          HED4
004570  010421                          MES0
004572  010435                          MES1
004574  177777                          -1
004576  004767  003446                  JSR     %7,INCTAB       ;INC ERROR COUNT
004602  005067  174246                  CLR     DMA             ;DISK ADDRESS ERROR RESTART PROGRAM
004606  032777  002000  174164          BIT     #BIT10,@SWR     ;HALT ON ERROR
004614  001401                          BEQ     .+4
004616  000000                          HALT                    ;SWITCH 10 SET IN SWR HALT
004620  000207                          RTS     %7

004622  105767  174216          CMDAE:  TSTB    FLAG            ;CHECK FOR LAST DISK BUFFER
004626  100013                          BPL     BUFINX
```

```
1224  004630  005067  174220           BUFEXIT:CLR     DMA             ;CLEAR ADDRESS BITS
1225  004634  062716  000002                   ADD     #2,(6)          ;INC STOCK POINTER
1226  004640  042767  000200  174176   AKH:    BIC     #200,FLAG
1227  004646  016767  174214  174174           MOV     SWRDCT,WRDCT
1228  004654  000442                   BR      EXTDR           ;EXIT
1229  004656  005067  174234           BUFINX: CLR     WORK2           ;BLOCK COUNT
1230  004662  016767  174166  174222           MOV     DMA,WORK
1231  004670  005267  174222           XINCSEC:INC     WORK2           ;NEW BLOCK COUNT
1232  004674  022767  003777  174210           CMP     #3777,WORK      ;CMP FOR LAST SECTOR
1233  004702  001406                   BEQ     XINCSUR         ;+1 SURFACE
1234  004704  005267  174202                   INC     WORK
1235  004710  005367  174200           CONTINC:DEC     WORK1           ;DEC BLOCK COUNT
1236  004714  001365                   BNE     XINCSEC         ;LAST BLOCK?
1237  004716  000750                   BR      AKH             ;SO ANOTHER STANDARD WD COUNT
1238  004720  016767  174172  174122   XINCSUR:MOV     WORK2,WRDCT     ;CONVERT BLOCK COUNT TO WC
1239  004726  000241                   CLC
1240  004730  006167  174114                   ROL     WRDCT
1241  004734  006167  174110                   ROL     WRDCT
1242  004740  006167  174104                   ROL     WRDCT
1243  004744  006167  174100                   ROL     WRDCT
1244  004750  006167  174074                   ROL     WRDCT
1245  004754  052767  000200  174062           BIS     #200,FLAG
1246  004762  000207           EXTDR:  RTS     %7              ;EXIT
1247
1248                           ;ROUTINE TO SET UP THE DISK NUMBER FOR THE ADDRESS TEST
1249
1250  004764  016767  174054  174120   DSKNOS: MOV     FLAG,WORK       ;FETCH THE FLAG WORD
1251  004772  000367  174114           SWAB    WORK
1252  004776  006167  174110           ROL     WORK
1253  005002  042767  163777  174102           BIC     #163777,WORK    ;MASK THE DISK NUMBER
1254  005010  056777  174076  174012           BIS     WORK,@RCDA      ;LOAD THE ADDRESS IN TH ADDRESS REG
1255  005016  000205                   RTS     %5              ;EXIT
```

```
1256                                        ;THIS ROUTINE CONVERTS A WORD COUNT TO A BLOCK COUNT
1257
1258  005020  012767  000037  174056  BLSZ:   MOV     #37,BLOCK
1259  005026  016767  174016  174056          MOV     WRDCT,WORK      ;FETCH WORD COUNT
1260  005034  036767  174044  174050          BIT     BLOCK,WORK
1261  005042  001410                          BEQ     RORBLK
1262  005044  046767  174034  174040          BIC     BLOCK,WORK      ;SET UP BLOCK OVERFLOW
1263  005052  005267  174026                  INC     BLOCK
1264  005056  066767  174022  174026          ADD     BLOCK,WORK
1265  005064  000241                  RORBLK: CLC
1266  005066  006067  174020                  ROR     WORK
1267  005072  006067  174014                  ROR     WORK
1268  005076  006067  174010                  ROR     WORK
1269  005102  006067  174004                  ROR     WORK
1270  005106  006067  174000                  ROR     WORK
1271  005112  016767  173774  173764          MOV     WORK,BLOCK      ;BLOCK COUNT
1272  005120  000207                          RTS     %7              ;EXIT
1273
1274
1275                                        ;ROUTINE TO SELECT DATA PATTERNS FOR TEST
1276
1277                                        ;ENTER FROM JSR %5,PASEL
1278
1279  005122  016700  173730          PASEL:  MOV     PATNU,%0        ;SET UP PATTERN NUMBER
1280  005126  016767  173716  173756          MOV     WRDCT,WORK      ;SET UP WORK
1281  005134  012701  011432                  MOV     #OUTBUF,%1      ;LOC. OF OUTBUFFER
1282  005140  022700  000042                  CMP     #42,%0          ;TEST FOR RANDOM DATA NUMBER
1283  005144  001406                          BEQ     RANDOM          ;GO GENERATE RANDOM DATA
1284  005146  016021  005314          FILDAT: MOV     PAT0(0),(1)+    ;FILL BUFFER
1285  005152  005367  173734                  DEC     WORK            ;DEC. WORK COUNT
1286  005156  001373                          BNE     FILDAT          ;LOAD NEXT WORD
1287  005160  000205                          RTS     %5              ;BUFFER FULL
```

```
1288                                        ;RANDOM DATA GENERATOR SUBROUTINE
1289
1290  005162  016700  000122        RANDOM: MOV     LONUM,%0        ;SET UP R0 WITH 5 DIGITS LOW
1291  005166  016704  000120                MOV     HINUM,%4        ;SET UP R1 WITH 5 DIGITS HIGH
1292  005172  012703  000007                MOV     #7,%3           ;SET UP SHIFT COUNT
1293  005176  005002                        CLR     %2              ;CLEAR R2
1294  005200  006300                SHIFT:  ASL     %0              ;SHIFT R0 LEFT AND
1295  005202  006104                        ROL     %4              ;ROTATE CARRY INTO LSB OF R1 INTO
1296  005204  006102                        ROL     %2              ;ROTATE CARRY OUT OF R1 INTO R2
1297  005206  005303                        DEC     %3              ;DECREMENT R3
1298  005210  001373                        BNE     SHIFT           ;CONTINUE SHIFT LOOP
1299  005212  066700  000072                ADD     LONUM,%0        ;ADDN IN NUMBER TO MAKE X 129
1300  005216  005504                        ADC     %4              ;PROPOGATE CARRY
1301  005220  066704  000066                ADD     HINUM,%4        ;ADDN IN NUMBER TO MAKE X 129
1302  005224  005502                        ADC     %2              ;PROPOGATE CARRY
1303  005226  062700  001057                ADD     #1057,%0        ;ADDN LOW CONSTANT
1304  005232  005504                        ADC     %4              ;PROPOGATE CARRIES
1305  005234  005502                        ADC     %2              ;PROPOGATE AGAIN
1306  005236  062704  047401                ADD     #47401,%4       ;ADDN HIGH CONSTANT
1307  005242  005502                        ADC     %2              ;PROPOGATE CARRY
1308  005244  062702  000006                ADD     #6,%2           ;ADDN HIGHEST CONSTANT
1309  005250  062700  000002                ADD     #2,%0           ;REPRIME R0 WITH HIGH DIGIT
1310  005254  005504                        ADC     %4              ;PROPOGATE CARRY
1311  005256  010067  000026                MOV     %0,LONUM        ;PUT R0 BACK IN LONUM
1312  005262  010021                        MOV     %0,(1)+         ;HOLD LONUM FOR PROGRAM
1313  005264  005367  173622                DEC     WORK
1314  005270  001406                        BEQ     EXGEN
1315  005272  010467  000014                MOV     %4,HINUM        ;PUT R1 BACK IN HINUM
1316  005276  010421                        MOV     %4,(1)+         ;HOLD HINUM FOR PROGRAM
1317  005300  005367  173606                DEC     WORK
1318  005304  001326                        BNE     RANDOM
1319  005306  000205                EXGEN:  RTS     %5              ;RETURN TO PROGRAM
1320  005310  000000                LONUM:  0
1321  005312  000000                HINUM:  0
```

```
1322                                    ;RC11 DATA PATTERNS
1323
1324  005314  000000                    PAT0:   0
1325  005316  177777                    PAT1:   177777
1326  005320  134510                    PAT2:   134510
1327  005322  043267                    PAT3:   043267
1328  005324  100000                    PAT4:   100000
1329  005326  107070                    PAT5:   107070
1330  005330  070707                    PAT6:   070707
1331  005332  052525                    PAT7:   052525
1332  005334  125252                    PAT10:  125252
1333  005336  177737                    PAT11:  177737
1334  005340  004102                    PAT12:  004102
1335  005342  136363                    PAT13:  136363
1336  005344  063636                    PAT14:  063636
1337  005346  000001                    PAT15:  000001
1338  005350  100005                    PAT16:  100005
1339  005352  000520                    PAT17:  000520
1340  005354  030303                    PAT20:  030303
1341                                    ;PAT21  RANDOM DATA
1342
1343                                    ;DATA COMPARISON ROUTINE
1344                                    ;IF AN ERROR OCCURS BETWEEN THE OUT-BUFFER AND
1345                                    ;THE IN-BUFFER AN ERROR WILL BE REPORTED IN THE
1346
1347  005356  005067  173534            COMPARE:CLR     WORK2           ;WORD COUNT
1348  005362  005067  173526                    CLR     WORK1
1349  005366  016767  173462  173516            MOV     DMA,WORK
1350  005374  012767  000040  173502            MOV     #40,BLOCK       ;LO DENSITY DRIVE
1351  005402  012767  011432  173462            MOV     #OUTBUF,SAVE    ;SET UP OUTBUFFER POINTER
1352  005410  016767  173474  173456            MOV     INBUF,SAV1      ;SET UP IN BUFFER POINTER
1353  005416  027777  173450  173450  WRDCMP:   CMP     @SAVE,@SAV1     ;COMPARE BUFFERS
1354  005424  001030                    BNE     WDERR           ;WORD IN ERROR
1355  005426  005267  173464            WRDINC: INC     WORK2           ;+1 WORD COUNT
1356  005432  005267  173456                    INC     WORK1
1357  005436  026767  173406  173452            CMP     WRDCT,WORK2     ;IS COMPLETE BUFFER CHECKED
1358  005444  001417                    BEQ     ADAM            ;EXIT ROUTINE
1359  005446  036767  173432  173440            BIT     BLOCK,WORK1
1360  005454  001404                    BEQ     BLAD1
1361  005456  005267  173430            BALDIX: INC     WORK
1362  005462  005067  173426                    CLR     WORK1
1363  005466  062767  000002  173376  BLAD1:    ADD     #2,SAVE
1364  005474  062767  000002  173372            ADD     #2,SAV1
1365  005502  000745                    BR      WRDCMP          ;COMPARE NEXT WORD
1366  005504  000205                    ADAM:   RTS     %5              ;EXIT THIS ROUTINE
```

```
1367  005506  052767  001000  173330  WDERR:  BIS     #BIT9,FLAG      ;SET ERROR BIT
1368  005514  004567  001300                  JSR     %5,CONV         ;CONVERT WORD ADDR TO ASCII
1369  005520  001112                          WORK
1370  005522  010435                          MES1
1371  005524  000006                          6
1372  005526  004567  001266                  JSR     %5,CONV
1373  005532  001114                          WORK1
1374  005534  010543                          MES4
1375  005536  000002                          2
1376  005540  017767  173326  001332          MOV     @SAVE,ACNVX     ;FETCH GOOD DATA
1377  005546  004567  001246                  JSR     %5,CONV         ;CONVERT GOOD DATA TO ASCII
1378  005552  007100                          ACNVX
1379  005554  010563                          MES5X
1380  005556  000006                          6
1381  005560  017767  173310  001312          MOV     @SAV1,ACNVX     ;FETCH BAD DATA
1382  005566  004567  001226                  JSR     %5,CONV         ;CONVERT TO ASCII
1383  005572  007100                          ACNVX
1384  005574  010575                          MES6X
1385  005576  000006                          6
1386  005600  016767  173240  001272          MOV     FLAG,ACNVX      ;WHICH READ THE
1387  005606  042767  177774  001264          BIC     #177774,ACNVX   ;ERROR OCCURRED ON
1388  005614  004567  001200                  JSR     %5,CONV
1389  005620  007100                          ACNVX
1390  005622  010625                          MES13
1391  005624  000001                          1
1392  005626  104000                          EMT     +0              ;PRINT MESSAGE
1393  005630  010306                          HED1
1394  005632  010625                          MES13
1395  005634  010435                          MES1
1396  005636  010543                          MES4
1397  005640  010560                          MES5
1398  005642  010572                          MES6
1399  005644  177777                          -1
1400  005646  032777  002000  173124          BIT     #BIT10,@SWR     ;HALT ON ERROR
1401  005654  001401                          BEQ     .+4
1402  005656  000000                          HALT                    ;YES HALT BIT 10 SET IN SWR
1403  005660  000662                          BR      WRDINC          ;GO COMPARE NEXT WORD
```

```
1404                                    ;EXTENDED MEMORY EXERCISER
1405                                    ;THE PROGRAM DETERMINES HOW MUCH MEMORY
1406                                    ;IS ON THE SYSTEM THEN IT
1407                                    ;GENERATES A RANDOM BUFFER THAT SIZE
1408                                    ;AND WRITES AND WRITE CHECKS THE DATA
1409
1410  005662  012777  000340  173112  EXTMEN: MOV     #340,@PS        ;LOCK UP PRIORITY LEVELS
1411  005670  013767  000042  173174          MOV     @#42,SAVE       ;GET MONITOR ADDRESS
1412  005676  001410                          BEQ     1$              ;SKIP IF 0
1413  005700  100432                          BMI     LGMEM           ;GREATER THAN 16K
1414  005702  162767  000020  173162          SUB     #20,SAVE        ;DEC IT
1415  005710  022767  011432  173154          CMP     #OUTBUF,SAVE    ;IS IT ACT11?
1416  005716  100432                          BMI     GOTMEM          ;NO - SKIP
1417  005720  012767  005776  172056  1$:     MOV     #MAXREF,4       ;SET UP I/O BUS TRAP
1418  005726  012767  000340  172052          MOV     #340,6
1419  005734  012767  017446  173130          MOV     #17446,SAVE     ;SET UP FOR 4K
1420  005742  005777  173124          EXREF:  TST     @SAVE           ;REFERENCE MEMORY
1421  005746  022767  177446  173116          CMP     #177446,SAVE    ;TEST FOR GREATER THAN 28K
1422  005754  001410                          BEQ     MAXREF          ;LAST REFERENCE MADE TO I/O REG.
1423  005756  062767  020000  173106          ADD     #20000,SAVE     ;SET UP FOR NEXT MEMORY REF.
1424  005764  000766                          BR      EXREF           ;GO REFERENCE MEMORY
1425  005766  162767  000024  173076  LGMEM:  SUB     #24,SAVE        ;DEC IT
1426  005774  000403                          BR      GOTMEM
1427
1428                                    ;ENTER HERE WHEN I/O BUS ERROR OCCURS
1429
1430  005776  162767  020000  173066  MAXREF: SUB     #20000,SAVE     ;
1431  006004  012767  000006  171772  GOTMEM: MOV     #6,4            ;RESTORE I/O BUS TRAP
1432  006012  005067  171770                  CLR     6
1433  006016  162767  011432  173046          SUB     #OUTBUF,SAVE    ;SET UP NEW WORD COUNT
1434  006024  006067  173042                  ROR     SAVE
1435  006030  016767  173036  173012          MOV     SAVE,WRDCT      ;
1436  006036  042767  000001  173026          BIC     #BIT0,SAVE
1437  006044  012767  011432  173036          MOV     #OUTBUF,INBUF
1438  006052  066767  173014  173030          ADD     SAVE,INBUF
1439  006060  006067  172764                  ROR     WRDCT
1440  006064  042767  000037  172756          BIC     #37,WRDCT
1441  006072  004767  176722                  JSR     %7,BLSZ
1442  006076  000241                  BUFOK:  CLC
1443  006100  006167  173000                  ROL     BLOCK
1444  006104  006167  172774                  ROL     BLOCK
1445  006110  006167  172770                  ROL     BLOCK
1446  006114  006167  172764                  ROL     BLOCK
1447  006120  006167  172760                  ROL     BLOCK
1448  006124  016767  172754  172734          MOV     BLOCK,SWRDCT
1449  006132  000205                          RTS     %5
```

```
1450                                        ;BACKGROUND TEST FOR INTERRUPTS
1451
1452  006134  012767  006262  171652  XWAIT:  MOV     #RTIX,14        ;SET UP TRACE TRAP
1453  006142  005067  171650                CLR     16
1454  006146  012737  006170  000010        MOV     #1$,@#10        ;SET ILL INST.
1455  006154  006727  000000                SXT     #0              ;TEST FOR 11/45
1456  006160  012767  000006  000074        MOV     #6,RTIX         ;MAKE IT AN RTT
1457  006166  000401                        BR      2$              ;SKIP JUNK
1458  006170  022626                1$:     CMP     (6)+,(6)+       ;CLEAR STACK
1459  006172  012737  000012  000010  2$:   MOV     #12,@#10        ;RESET 10
1460  006200  005067  172672                CLR     PASS            ;SET UP TIME BASE
1461  006204  012746  000020                MOV     #BIT4,-(6)      ;SET TRACE TRAP BIT
1462  006210  012746  006216                MOV     #.+6,-(6)
1463  006214  000002                        RTI                     ;RETURNS TO NEXT LOC WITH T BIT SET
1464  006216  005027  000000                CLR     #0
1465  006222  005267  177772        XINCW:  INC     XINCW-2
1466  006226  105767  177766                TSTB    XINCW-2
1467  006232  100373                        BPL     XINCW
1468  006234  005267  172636                INC     PASS
1469  006240  001401                        BEQ     .+4
1470  006242  000765                        BR      XINCW-4
1471                                ;REPORT BACKGROUND TEST TIMED OUT
1472  006244  005046                        CLR     -(6)            ;CLEAR PS ON STACK
1473  006246  012746  006254                MOV     #1$,-(6)        ;SET RETURN
1474  006252  000002                        RTI                     ;CLEAR TRACE BIT
1475  006254  104001                1$:     EMT+1
1476  006256  010642                        TIMO
1477  006260  000000                        HALT
1478  006262  000002                RTIX:   RTI
1479
1480                                ;ROUTINE TO ALLOW THE OPERATOR TO SET BITS
1481                                ;THIS ROUTINE ENABLES THE OPERATOR TO SELECT A TRACK STATICLY
1482                                ;THE ROUTINE DOES A ONE WORD READ TO SELECT THE TRACK
1483                                ;THE OPERATOR MAY CHANGE THE SWITCH REGISTER AT ANY TIME
1484                                ;SWR4-0 EQUALS THE TRACK NUMBER
1485                                ;SWR6-5 EQUALS THE DISK NUMBER
1486
1487  006264  017767  172510  172622  TKSEL:  MOV     @SWR,WORK1      ;FETCH SWR
1488  006272  017767  172502  172616          MOV     @SWR,WORK2
1489  006300  042767  177600  172606          BIC     #177600,WORK1   ;MASK DISK AND TRACK NO.
1490  006306  016767  172602  172576          MOV     WORK1,WORK
1491  006314  000241                          CLC
1492  006316  006167  172570                  ROL     WORK
1493  006322  006167  172564                  ROL     WORK
1494  006326  006167  172560                  ROL     WORK
1495  006332  006167  172554                  ROL     WORK
1496  006336  006167  172550                  ROL     WORK
1497  006342  006167  172544                  ROL     WORK
1498  006346  016777  172540  172454          MOV     WORK,@RCDA      ;DISK ADDRESS LOADED
1499  006354  016777  172530  172444          MOV     INBUF,@RCBA     ;LOAD CURRENT ADDRESS
1500  006362  012777  177777  172434          MOV     #177777,@RCWC   ;LOAD WORD COUNT
1501  006370  012777  000005  172424          MOV     #5,@RCCS        ;GO AND READ
1502  006376  105777  172420                  TSTB    @RCCS           ;TEST FOR READY
1503  006402  100375                          BPL     .-4
1504  006404  026777  172506  172366  SRCHG:  CMP     WORK2,@SWR
1505  006412  001324                          BNE     TKSEL           ;SWR HAS CHANGED
```

```
 1506  006414  000773                          BR      SRCHG           ;LOOP ON SAME ADDR
```

```
1507                                    ;ROUTINE TO REPORT ERROR COUNT AND CONTENTS OF ONE REGISTER
1508
1509  006416  004567  000376    STAER:  JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1510  006422  001112                    WORK                    ;DATA TO BE CONVERTED
1511  006424  010575                    MES6X                   ;ADDRESS OF MESSAGE
1512  006426  000006                    6
1513  006430  004567  000364            JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1514  006434  001070                    ERCOUNT
1515  006436  010401                    HED5X                   ;ADDRESS OF MESSAGE
1516  006440  000001                    1
1517  006442  104000                    EMT     +0              ;REPORT MESSAGE
1518  006444  010372                    HED5
1519  006446  010572                    MES6
1520  006450  177777                    -1
1521  006452  004767  001572            JSR     %7,INCTAB       ;INCREMENT ERROR COUNT
1522  006456  000426                    BR      STAERX
1523
1524                                    ;ROUTINE TO REPORT ERROR COUNT AND THE CONTENTS OF TWO REGISTERS
1525
1526  006460  004567  000334    STAER1: JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1527  006464  001112                    WORK                    ;DATA TO BE CONVERTED
1528  006466  010575                    MES6X                   ;ADDRESS OF MESSAGE
1529  006470  000006                    6
1530  006472  004567  000322            JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1531  006476  001114                    WORK1                   ;DATA TO BE CONVERT
1532  006500  010563                    MES5X                   ;ADDRESS OF MESSAGE
1533  006502  000006                    6
1534  006504  004567  000310            JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
1535  006510  001070                    ERCOUNT
1536  006512  010401                    HED5X                   ;ADDRESS OF MESSAGE
1537  006514  000001                    1
1538  006516  104000                    EMT     +0              ;REPORT MESSAGE
1539  006520  010372                    HED5
1540  006522  010560                    MES5
1541  006524  010572                    MES6
1542  006526  177777                    -1
1543  006530  004767  001514            JSR     %7,INCTAB       ;INCREMENT ERROR COUNT
1544  006534  032777  002000  172275    BIT     #BIT10,@SWR
1545  006542  001401                    BEQ     .+4
1546  006544  000000                    HALT
1547  006546  000205                    RTS     %5              ;EXIT ROUTINE
1548
1549                                  ;ROUTINE TO DECODE EMT CALLS
1550                                  ;EMT+1=TYPE ONE LINE OF TEXT
1551                                  ;EMT+0=TYPE A SERIES OF LINES
1552
1553  006550  011600            EMTRP:  MOV     (6),%0
1554  006552  022740  104001            CMP     #EMT+1,-(0)     ;WAS THE CALL EMT+1
1555  006556  001103                    BNE     TYPS            ;NO! TYPE A SERIES OF LINES OF TEXT
1556  006560  000400                    BR      TYP             ;YES TYPE ONE LINE OF TEXT
```

```
1557                                    ;SUBROUTINE TO OUTPUT ASCII MESSAGES ON THE TTY
1558
1559  006562  011600            TYP:    MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1560  006564  062716  000002            ADD     #2,@%6          ;SET UP EXIT.
1561  006570  011000                    MOV     @%0,%0          ;ADDRESS OF MESSAGE TO R0.
1562  006572  112067  000164    TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
1563  006576  122767  000100  000156    CMPB    #100,TYPDAT     ;CHECK FOR "@" CHARACTER
1564  006604  001005                    BNE     TYPC            ;CRANCH IF NOT "@".
1565  006606  005067  000150            CLR     TYPDAT          ;OUTPUT NULL TO
1566  006612  004767  000030            JSR     %7,TYPD         ;CLEAR BUFFER
1567  006616  000002                    RTI                     ;TERMINATOR CHAR. DONE. EXIT.
1568  006620  122767  000045  000134 TYPC:   CMPB    #45,TYPDAT      ;CHECK FOR "%".
1569  006626  001442                    BEQ     TYPF            ;BRANCH IF "%".
1570  006630  122767  000042  000124    CMPB    #42,TYPDAT      ;NOT "%". CHECK FOR "*".
1571  006636  001443                    BEQ     TYPG            ;BRANCH IF "*"
1572  006640  004767  000002            JSR     %7,TYPD         ;TYPE CHAR IN TYPDAT
1573  006644  000752                    BR      TYPA
1574  006646  032777  040000  172124 TYPD:   BIT     #BIT14,@SWR
1575  006654  001026                    BNE     TYEXIT
1576  006656  116777  000100  172120        MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
1577  006664  105777  172120            TSTB    @TPS            ;WAIT FOR DONE FLAG.
1578  006670  100375                    BPL     .-4
1579  006672  122767  000015  000062        CMPB    #15,TYPDAT      ;CHECK FOR CR
1580  006700  001003                    BNE     1$              ;NO-SKIP
1581  006702  012767  000011  000054        MOV     #9.,NULL        ;SET NULL COUNTER
1582  006710  005767  000050         1$:    TST     NULL            ;TEST COUNTER
1583  006714  001406                    BEQ     TYEXIT          ;ZERO-EXIT
1584  006716  005367  000042            DEC     NULL            ;DECREMENT
1585  006722  112767  000000  000032        MOVB    #0,TYPDAT       ;ZERO OUTPUT
1586  006730  000746                    BR      TYPD            ;OUTPUT NULL
1587  006732  000207            TYEXIT: RTS     %7              ;EXIT
1588  006734  112767  000015  000020 TYPF:   MOVB    #15,TYPDAT      ;MOVE CARRIAGE RETURN CODE TO TYPDAT
1589  006742  004767  177700            JSR     %7,TYPD         ;GO TYPE CHAR.
1590  006746  112767  000012  000006 TYPG:   MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT.
1591  006754  004767  177666            JSR     %7,TYPD         ;GO TYPE CHAR.
1592  006760  000704                    BR      TYPA
1593  006762  000000            TYPDAT: 0
1594  006764  000000            NULL:   0
1595                                    ;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
1596  006766  011600            TYPS:   MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1597  006770  062716  000002            ADD     #2,@%6          ;UPDATE TO NEXT MESSAGE ADDRESS
1598  006774  011067  000014            MOV     @%0,TYPSB       ;ADDRESS OF MESSAGE TO TYPSB
1599  007000  022767  177777  000006        CMP     #-1,TYPSB       ;CHECK FOR TERMINATOR
1600  007006  001001                    BNE     TYPSA           ;BRANCH IF NOT TERMINATOR.
1601  007010  000002                    RTI                     ;TERMINATOR. EXIT
1602  007012  104001            TYPSA:  EMT     +1              ;CALL ON TYP SUB TO TYPE MESSAGE
1603  007014  000000            TYPSB:  0                       ;ADDRESS OF MESSAGE GOES HERE
1604  007016  000763                    BR      TYPS            ;GO PROCESS NEXT MESSAGE
1605
1606
1607                                    ;OCTAL TO ASCII CONVERT ROUTINE
1608
1609                                    ;ENTER ROUTINE AS FOLLOWS
1610                                    ;JSP%5,CONV
1611                                    ;ADDR#=ADDRESS OF NUMBER TO BE CONVERTED
1612                                    ;ADDR BYTE=LSB OF WHERE ASCII IS GOING
```

```
1613                                    ;ASCII#=THE NUMBER OF ASCII CHAR. TO BE CONVERTED
1614
1615  007020  013567  000054    CONV:   MOV     @(5)+,ACNVX     ;VALUE OF # TO BE CONVERTED
1616  007024  012501                    MOV     (5)+,%1         ;ASCII ADDR
1617  007026  012502                    MOV     (5)+,%2         ;# OF ASCII CHAR
1618  007030  060201                    ADD     %2,%1
```

```
1619  007032  016703  000042          ACVN:   MOV     ACNVX,%3
1620  007036  042703  177770                  BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT OCTAL#
1621  007042  062703  000060                  ADD     #60,%3          ;SET UP ASCII#
1622  007046  110341                          MOVB    %3,-(1)         ;STORE ASCII CHAR
1623  007050  042767  000007  000022          BIC     #7,ACNVX
1624  007056  006067  000016                  ROR     ACNVX           ;ROTATE OCTAL#
1625  007062  006067  000012                  ROR     ACNVX
1626  007066  006067  000006                  ROR     ACNVX
1627  007072  005302                          DEC     %2              ;-1 FROM ASCII CHAR COUNT
1628  007074  001356                          BNE     ACVN
1629  007076  000205                          RTS     %5              ;EXIT # CONVERTED
1630  007100  000000          ACNVX:  0                               ;WORK REGISTER
1631
1632                                  ;ROUTINE TO HANDLE KEYBOARD CONVERSATION
1633                                  ;ROUTINE ACCEPTS NUM. OR ALPHA CHARACTERS
1634
1635  007102  012767  000040  001174  NOCHA:  MOV     #40,TSTCH       ;SET UP FOR NUM. CHAR.
1636  007110  000403                          BR      TYST
1637  007112  012767  000100  001164  ALPHA:  MOV     #100,TSTCH      ;SET UP FOR ALPHA CHAR
1638  007120  012777  000340  171654  TYST:   MOV     #340,@PS        ;LOCK UP INTERRUPTS
1639  007126  005067  001150                  CLR     TEXBUF          ;CLEAR TEXT BUFFER REG
1640  007132  105777  171654          TSTFLG: TSTB    @TKS            ;CHECK FOR FLAG
1641  007136  100375                          BPL     TSTFLG          ;
1642  007140  017777  171642  171636          MOV     @TKB,@TPB       ;CHARACTER IN BUFFER
1643  007146  105777  171636                  TSTB    @TPS            ;ECHO CHARACTER
1644  007152  100375                          BPL     .-4
1645  007154  022777  000377  171624          CMP     #377,@TKB       ;CHECK FOR RUB-OUT
1646  007162  001014                          BNE     CKCH            ;EXIT IF NOT RUB-OUT
1647  007164  104001                          EMT     +1
1648  007166  010606                          MES8                    ;REPORT RUB-OUT ACKNOWLEDGED
1649  007170  042767  000007  001104          BIC     #7,TEXBUF
1650  007176  006067  001100                  ROR     TEXBUF
1651  007202  006067  001074                  ROR     TEXBUF
1652  007206  006067  001070                  ROR     TEXBUF
1653  007212  000747                          BR      TSTFLG          ;GO WAIT FOR NEW CHAR.
1654  007214  022777  000215  171564  CKCH:   CMP     #215,@TKB       ;CHECK FOR CARRIAGE RETURN
1655  007222  001001                          BNE     .+4
1656  007224  000207                          RTS     %7              ;EXIT DELIMITER TYPED
1657  007226  036777  001052  171552          BIT     TSTCH,@TKB
1658  007234  001003                          BNE     CHOK
1659  007236  104001                          EMT     +1              ;REPORT QUESTION MARK
1660  007240  010604                          MES7
1661  007242  000733                          BR      TSTFLG          ;WAIT FOR CORRECT CHAR.
1662  007244  017767  171536  171640  CHOK:   MOV     @TKB,WORK
1663  007252  042767  177770  171632          BIC     #177770,WORK
1664  007260  000241                          CLC
1665  007262  006167  001014                  ROL     TEXBUF
1666  007266  000241                          CLC
1667  007270  006167  001006                  ROL     TEXBUF
1668  007274  000241                          CLC
1669  007276  006167  001000                  ROL     TEXBUF
1670  007302  066767  171604  000772          ADD     WORK,TEXBUF     ;ADD CHARACTER
1671  007310  000710                          BR      TSTFLG          ;WAIT FOR NEW CHARACTER
```

```
                                        ;RC11 POWER FAIL TEST #1
                                        ;       DISK ZERO
                                        ;       WRITE COMPLETE DISK WITH 125252 PATTERN
                                        ;       REPORT "OK"
                                        ;START WRITING THE SAME PATTERN
                                        ;WHEN POWER FAIL OCCURS ABORT TRANSFER
                                        ;SETUP NEW ENTRY POINT AND HALT

                                        ;POWER UP AND WRITE CHECK THE DISK FOR ERRORS

                                        ;***ONLY ONE ERROR IS CONSIDERED ACCEPTABLE***

007312  012706  001000          PFT1:   MOV     #1000,%6        ;SET UP STACK
007316  004767  000374                  JSR     %7,POWFAL       ;WRITE 125252 ON DISK
007322  005067  171526          PFWAT:  CLR     DMA
007326  005067  171520                  CLR     TRACK
007332  012767  007322  171542          MOV     #PFWAT,HRDER    ;SET UP FOR HARD ERROR
007340  012767  007470  170456          MOV     #DOWN,24        ;SET UP POWER FAIL VEC.
007346  012767  000340  170452          MOV     #340,26
007354  104503                  MYBYWR: WRITE   +100
007356  032777  001000  171414          BIT     #BIT9,@SWR
007364  001002                          BNE     .+6
007366  000004                          IOT
007370  000404                          BR      .+12
007372  016777  171444  171402          MOV     PRIORITY,@PS
007400  000001                          WAIT
007402  004767  175004                  JSR     %7,DISBUF       ;SET UP NEW DISK BUFFER
007406  000762                          BR      MYBYWR
007410  000744                          BR      PFWAT

                                        ;ROUTINE TO CHECK DATA AFTER POWER FAIL

007412  005067  171436          UPCHK:  CLR     DMA
007416  005067  171430                  CLR     TRACK
007422  012767  007412  171452          MOV     #UPCHK,HRDER    ;SET UP FOR HARD ERROR
007430  104507                  CHKDAT: WRCHECK +100
007432  032777  001000  171340          BIT     #BIT9,@SWR
007440  001002                          BNE     .+6
007442  000004                          IOT
007444  000404                          BR      .+12
007446  016777  171370  171326          MOV     PRIORITY,@PS
007454  000001                          WAIT
007456  004767  174730                  JSR     %7,DISBUF       ;SET UP NEW DISK BUFFER
007462  000762                          BR      CHKDAT
007464  000167  177632                  JMP     PFWAT           ;GO WAIT FOR ANOTHER
                                                                ;POWER FAIL
```

```
1718                                        ;POWER DOWN ROUTINE
1719                                        ;ABORT DISK AND HALT
1720
1721  007470  052777  000400  171324  DOWN:   BIS     #BIT8,@RCCS     ;ABORT DISK
1722  007476  012767  007506  170320          MOV     #UP,24          ;SET POWER FAIL VECTOR
1723  007504  000000                          HALT
1724
1725  007506  012767  007470  170310  UP:     MOV     #DOWN,24
1726  007514  012706  001000                  MOV     #1000,%6
1727  007520  012767  177324  171364          MOV     #-300.,WORK     ;SET UP TWENTY SECOND TIMER
1728  007526  000005                  TIMCNT: RESET
1729  007530  005267  171356                  INC     WORK            ;+1 TIMER
1730  007534  001374                          BNE     TIMCNT          ;TWO SECONDS NOT UP GO WAIT
1731  007536  104001                          EMT     +1              ;REPORT PWR FAIL
1732  007540  010702                          PWRF
1733  007542  000167  177644                  JMP     UPCHK           ;GO CHECK DISK
1734
1735
1736                                        ;POWER FAIL TEST #2
1737                                        ;DISK ZERO
1738                                        ;WRITE COMPLETE DISK WITH 125252 PATTERN
1739                                        ;REPORT "OK"
1740                                        ;WRITE CHECK DISK AND WAIT FOR POWER FAIL
1741                                        ;WHEN POWER COMES BACK WRITE CHECK DISK AGAIN
1742                                        ;AND CHECK FOR ERRORS
1743                                        ;***NO ERRORS SHOULD OCCUR.***
1744
1745                                        ;DO NOT CREATE ANOTHER POWER FAIL UNTIL
1746                                        ;THE ADDRESS REGISTER HAS COMPLETELY CYCLED
1747                                        ;THROUGH.
1748
1749  007546  012706  001000          PFT2:   MOV     #1000,%6        ;SET UP STACK
1750  007552  004767  000140                  JSR     %7,POWFAL       ;WRITE 125252 ON DISK
1751  007556  005067  171272          PWRFL:  CLR     DMA
1752  007562  005067  171264                  CLR     TRACK
1753  007566  012767  007556  171306          MOV     #PWRFL,HRDER    ;SET UP HARD ERROR
1754  007574  012767  007646  170222          MOV     #PWRDN,24       ;SET UP POWER FAIL VEC.
1755  007602  012767  000340  170216          MOV     #340,26
1756  007610  104507                  CHKDSK: WRCHECK +100
1757  007612  032777  001000  171160          BIT     #BIT9,@SWR
1758  007620  001002                          BNE     .+6
1759  007622  000004                          IOT                     ;WAIT IN BACKGROUND
1760  007624  000404                          BR      .+12
1761  007626  016777  171210  171146          MOV     PRIORITY,@PS
1762  007634  000001                          WAIT
1763  007636  004767  174550                  JSR     %7,DISBJF       ;CHECK NEXT BUFFER
1764  007642  000762                          BR      CHKDSK
1765  007644  000744                          BR      PWRFL
```

```
1766                                        ;ROUTINE TO ABORT DISK DURING POWER FAIL
1767
1768  007646  052777  000400  171146  PWRDN:  BIS     #BIT8,@RCCS     ;CLEAR THE DISK
1769  007654  012767  007664  170142          MOV     #PWRUP,24       ;SET UP RESTART
1770  007662  000000                          HALT
1771
1772  007664  012767  007646  170132  PWRUP:  MOV     #PWRDN,24       ;RESET POWER FAIL VECTOR
1773  007672  012706  001000                  MOV     #1000,%6
1774  007676  012767  177324  171206          MOV     #-300.,WORK     ;SET UP TWENTY SECOND TIMER
1775  007704  000005                  XTIMCNT:RESET
1776  007706  005267  171200                  INC     WORK            ;+1 TIMER
1777  007712  001374                          BNE     XTIMCNT         ;TWO SECONDS NOT UP GO WAIT
1778  007714  000720                          BR      PWRFL           ;GO CHECK DISK
1779
1780
1781                                        ;ROUTINE TO WRITE THE COMPLETE DISK
1782                                        ;WITH 125252 PATTERN
1783                                        ;WRITE CHECK AND REPORT ERRORS IF THEY
1784                                        ;OCCUR
1785                                        ;REPORT "OK" AT COMPLETION
1786
1787  007716  011667  171164          POWFAL: MOV     (6),PASSC
1788  007722  012706  001000                  MOV     #1000,%6
1789  007726  012767  000020  171122          MOV     #20,PATNU       ;SET UP PATTERN
1790  007734  005067  171114                  CLR     DMA
1791  007740  005067  171106                  CLR     TRACK
1792  007744  012767  002000  171114          MOV     #2000,SWRDCT    ;SETUP WORD COUNT
1793  007752  016767  171110  171070          MOV     SWRDCT,WRDCT
1794  007760  004567  175136                  JSR     %5,PASEL        ;GENERATE DATA BUFFER
1795  007764  012767  011432  171066          MOV     #OUTBUF,BUF     ;SET UP CURRENT ADDRESS
1796  007772  012767  007716  171102          MOV     #POWFAL,HRDER
1797  010000  104503                  WRDNW:  WRITE   +100
1798  010002  032777  001000  170770          BIT     #BIT9,@SWR      ;CHECK ON HOW TO WAIT
1799  010010  001002                          BNE     .+6
1800  010012  000004                          IOT                     ;BACKGROUND TEST
1801  010014  000404                          BR      .+12
1802  010016  016777  171020  170756          MOV     PRIORITY,@PS
1803  010024  000001                          WAIT
1804  010026  104507                          WRCHECK +100
1805  010030  032777  001000  170742          BIT     #BIT9,@SWR
1806  010036  001002                          BNE     .+6
1807  010040  000004                          IOT
1808  010042  000404                          BR      .+12
1809  010044  016777  170772  170730          MOV     PRIORITY,@PS
1810  010052  000001                          WAIT
1811  010054  004767  174332                  JSR     %7,DISBUF       ;SET UP NEW DISK BUFFER
1812  010060  000747                          BR      WRDNW           ;WRITE NEW BUFFER
1813  010062  104001                          EMT     +1
1814  010064  010635                          OK
1815  010066  000177  171014                  JMP     @PASSC
1816
1817                                        ;ROUTINE TO SET ACTION ENABLE ON MA/MF PARITY MEMORIES
1818                                        ;CALL JSR PC, MAMF
1819          172100                        PARCSR= 172100
1820          000114                        PARVEC= 114
1821          000004                        ERRVEC= 4
```

```
1822            000006                          SP=     %6
1823
1824  010072    012737  010164  000114  MAMF:   MOV     #PARSRV,@#PARVEC  ;SET PARITY INTERRUPT VECTOR
1825  010100    012737  000340  000116          MOV     #340,@#PARVEC+2 ;AND PRIORITY LEVEL 7 ON INTERRUPT
1826  010106    013746  000004                  MOV     @#ERRVEC,-(SP)  ;SAVE CURRENT ERROR VECTOR
1827  010112    013746  000006                  MOV     @#ERRVEC+2,-(SP)  ;AND PRIORITY LEVEL
1828  010116    012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC
1829  010124    012737  000002  000006          MOV     #RTI,@#ERRVEC+2
1830  010132    012700  172100                  MOV     #PARCSR,%0      ;GET FIRST CSR ADDRESS
1831  010136    012702  000001                  MOV     #1,%2
1832  010142    012720  000001          1$:     MOV     #1,(0)+         ;SET ACTION ENABLE IF AVAILABLE
1833  010146    006302                          ASL     %2              ;SHIFT AVAILABILITY INDICATOR
1834  010150    103374                          BCC     1$
1835  010152    012637  000006                  MOV     (SP)+,@#ERRVEC+2  ;RESTORE ERROR VECTOR
1836  010156    012637  000004                  MOV     (SP)+,@#ERRVEC  ;PRIORITY LEVEL AND INTERRUPT VECTOR
1837  010162    000207                          RTS     %7
1838
1839                                    ;PARITY ERROR SERVICE ROUTINE
1840                                    ;WHEN A PARITY ERROR IS DETECTED THE ROUTINE SCANS
1841                                    ;MEMORY FOR THE PARITY ERROR.  WHEN THE ERROR
1842                                    ;IS DETECTED THE PROGRAM HALTS WITH THE ADDRESS
1843                                    ;CAUSING THE ERROR IN R0
1844                                    ;TO CONTINUE PRESS CONTINUE
1845
1846  010164    104001                  PARSRV: EMT+1
1847  010166    010724                          PARERR
1848  010170    012737  010216  000114          MOV     #2$,@#PARVEC    ;REPOSITION PARITY ERROR INT.
1849  010176    012737  010244  000004          MOV     #4$,@#ERRVEC    ;SET TIME OUT TRAP
1850  010204    005037  000006                  CLR     @#ERRVEC+2
1851  010210    005000                          CLR     %0
1852  010212    005720                  1$:     TST     (0)+            ;SCAN MEMORY
1853  010214    000776                          BR      1$
1854  010216    000000                  2$:     HALT                    ;PARITY ERROR - ADDRESS
1855                                            ;CAUSING ERROR IS IN REGISTER 0
1856  010220    000005                  3$:     RESET
1857  010222    012737  010164  000114          MOV     #PARSRV,@#PARVEC  ;RESTORE PARITY VECTOR
1858  010230    012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC  ;RESTORE TIME OUT HALT
1859  010236    004767  177630                  JSR     %7,MAMF
1860  010242    000002                          RTI
1861  010244    000000                  4$:     HALT                    ;ERROR - PARITY ERROR NOT DETECTED ON SCAN
1862  010246    000764                          BR      3$              ;4(SP) CONTAINS PC WHERE
1863                                            ;PARITY ERROR WAS  ORIGINALLY DETECTED
1864
1865  010250    016703  170570          INCTAB: MOV     FLAG,%3
1866  010254    042703  177763                  BIC     #177763,%3      ;MASK DRIVE NO
1867  010260    000241                          CLC
1868  010262    006003                          ROR     %3              ;NORMALIZE
1869  010264    005263  010272                  INC     TABLE(3)        ;INCREMENT ERROR COUNT
1870  010270    000207                          RTS     %7
1871  010272    000000          TABLE:  0                               ;ERROR COUNT DRIVE 0
1872  010274    000000                  0                               ;ERROR COUNT DRIVE 1
1873  010276    000000                  0                               ;ERROR COUNT DRIVE 2
1874  010300    000000                  0                               ;ERROR COUNT DRIVE 3
```

```
1875  010302  000000                          TEXBUF: 0
1876  010304  000000                          TSTCH:  0
1877
1878  010306  042045  052101  020101  HED1:   .ASCII  /%DATA ERROR @/
1879  010314  051105  047522  020122
1880  010322     100
1881  010323     045  052123  052101  HED2:   .ASCII  /%STATUS ERROR @/
1882  010330  051525  042440  051122
1883  010336  051117  040040
1884  010342  042045  044522  042526  HED4:   .ASCII  /%DRIVE ADDRESS ERROR @/
1885  010350  040440  042104  042522
1886  010356  051523  042440  051122
1887  010364  051117  040040
1888  010370  040045                  HED5A:  .ASCII  /%@/
1889  010372  042445  051122  051117  HED5:   .ASCII  /%ERROR /
1890  010400     040
1891  010401     000     100          HED5X:  .BYTE   0,'@
1892  010403     045  040522  042516  HED6:   .ASCII  /%RANEX ERROR @/
1893  010410  020130  051105  047522
1894  010416  020122     100
1895  010421     040  020040  020040  MES0:   .ASCII  /       DMA @/
1896  010426  020040  046504  020101
1897  010434     100
1898  010435     040  020040  020040  MES1:   .ASCII  /       RCDA @/
1899  010442  020040  041522  040504
1900  010450  040040
1901  010452  020040  020040  020040  MES1A:  .ASCII  /       RCER @/
1902  010460  051040  042503  020122
1903  010466     100
1904  010467     040  020040  020040  MES2:   .ASCII  /       RCCS @/
1905  010474  020040  041522  051503
1906  010502  040040
1907  010504  020040  020040  020040  MES2A:  .ASCII  /       RCLA @/
1908  010512  051040  046103  020101
1909  010520     100
1910  010521     040  020040  020040  MES3:   .ASCII  /       WORD COUNT@/
1911  010526  020040  047527  042122
1912  010534  041440  052517  052116
1913  010542     100
1914  010543     040  020040  047527  MES4:   .ASCII  /   WORD ADR.@/
1915  010550  042122  040440  051104
1916  010556  040056
1917  010560  020040     040          MES5:   .ASCII  /  /
1918  010563     000     000     000  MES5X:  .BYTE   0,0,0,0,0,0,'@
1919  010566     000     000     000
1920  010571     100
1921  010572  020040     040          MES6:   .ASCII  /  /
1922  010575     000     000     000  MES6X:  .BYTE   0,0,0,0,0,0,'@
1923  010600     000     000     000
1924  010603     100
1925  010604  040077                  MES7:   .ASCII  /?@/
1926  010606  040057                  MES8:   .ASCII  '/@'
1927  010610  052445  044516  020124  MES11:  .ASCII  /%UNIT NO.@/
1928  010616  047516  040056
1929  010622  020040     100          MES12:  .ASCII  /  @/
1930  010625     040  051040  040505  MES13:  .ASCII  /  READ @/
```

```
1931  010632  020104     100
1932  010635     045  045517  040041  OK:     .ASCII  "%OK!@"
1933  010642  050045  047522  042503  TIMO:   .ASCII  /%PROCESSOR BACKGROUND TIMED OUT@/
1934  010650  051523  051117  041040
1935  010656  041501  043513  047522
1936  010664  047125  020104  044524
1937  010672  042515  020104  052517
1938  010700  040124
1939  010702  050045  053517  051105  PWRF:   .ASCII  /%POWER HAS FAILED@/
1940  010710  044040  051501  043040
1941  010716  044501  042514  040104
1942
1943  010724  046445  046505  051117  PARERR: .ASCII  /%MEMORY PARITY ERROR@/
1944  010732  020131  040520  044522
1945  010740  054524  042440  051122
1946  010746  051117     100
1947  010751     045  040504  040524  CON1:   .ASCII  /%DATA TEST ONLY? (YES-NO)@/
1948  010756  052040  051505  020124
1949  010764  047117  054514  020077
1950  010772  054450  051505  047055
1951  011000  024517     100
1952  011003     045  052515  052114  CON2:   .ASCII  /%MULTI DRIVE MODE?(YES-NO)@/
1953  011010  020111  051104  053111
1954  011016  020105  047515  042504
1955  011024  024077  042531  026523
1956  011032  047516  040051
1957  011036  047045  046525  042502  CON3:   .ASCII  /%NUMBER OF DRIVES (1 TO 4)?@/
1958  011044  020122  043117  042040
1959  011052  044522  042526  020123
1960  011060  030450  052040  020117
1961  011066  024464  040077
1962  011072  042445  042530  041522  CON4:   .ASCII  /%EXERCISE DRIVE?@/
1963  011100  051511  020105  051104
1964  011106  053111  037505     100
1965  011113     045  050117  044524  CON5:   .ASCII  /%OPTIONAL WORD COUNT (YES-NO)@/
1966  011120  047117  046101  053440
1967  011126  051117  020104  047503
1968  011134  047125  020124  054450
1969  011142  051505  047055  024517
1970  011150     100
1971  011151     045  042514  043516  CON6:   .ASCII  /%LENGTH (1 TO @/
1972  011156  044124  024040  020061
1973  011164  047524  040040
1974  011170  020040  020040  020040  CON6A:  .ASCII  /      )?@/
1975  011176  037451     100
1976  011201     045  052123  051101  CON7:   .ASCII  /%STARTING SECTOR?@/
1977  011206  044524  043516  051440
1978  011214  041505  047524  037522
1979  011222     100
1980  011223     045  040504  040524  CON8:   .ASCII  /%DATA PATTERN NO.?@/
1981  011230  050040  052101  042524
1982  011236  047122  047040  027117
1983  011244  040077
1984  011246  053445  044522  042524  CON9:   .ASCII  /%WRITE?(YES-NO)@/
1985  011254  024077  042531  026523
1986  011262  047516  040051
```

```
 1987  011266  053445  044522  042524  CON10:  .ASCII  /%WRITE CHECK?(YES-NO)@/
 1988  011274  041440  042510  045503
 1989  011302  024077  042531  026523
 1990  011310  047516  040051
 1991  011314  051045  040505  037504  CON11:  .ASCII  /%READ?(YES-NO)@/
 1992  011322  054450  051505  047055
 1993  011330  024517     100
 1994  011333     040  020040     100  PATMES: .ASCII  /   @/
 1995  011337     045  040520  052124  PATHED: .ASCII  /%PATTERN  @/
 1996  011344  051105  020116  040040
 1997  011352  042045  044522  042526  NODRV:  .ASCII  /%DRIVE ZERO OFF LINE@/
 1998  011360  055040  051105  020117
 1999  011365  043117  020106  044514
 2000  011374  042516     100
 2001  011377     045  020040  051104  RKNUM:  .ASCII  /%  DRIVE(S) ON LINE@/
 2002  011404  053111  024105  024523
 2003  011412  047440  020116  044514
 2004  011420  042516     100
 2005  011423     045  047105  077504  END:    .ASCII  /%END/<177>/@/
 2006  011430     100
 2007
 2008          011432                  .EVEN
 2009  011432  000000          OUTBUF: 0
 2010
 2011          000001                  .END
```

```
ACNVX   007100            829*   830*   831*   832*   834   1376*  1378   1381*  1383   1386*  1387*  1389   1615*
                         1619   1623*  1624*  1625*  1626*  1630*
ACVN    007032           1619*  1628
ADAM    005504           1358   1366*
ADERR   002510            890    895*
ADHGT   002462            881    887*
ADRD    003014            944    946*
ADTST   002156            724    822    825*  1067
ADT1    002250            597    852*   907
ADT3    002564            598    908*
AKH     004640           1226*  1237
ALPHA   007112            731    737    763    806    813    820   1637*
ASKWC   001634            750    761*
BALD1X  005456           1361*
BIT0  = 000001            573*  1436
BIT1  = 000002            574*  1107
BIT10 = 002000            583*   734    839   1136   1145   1217  1400   1544
BIT11 = 004000            584*   698    722    740    825    905  1034   1043
BIT12 = 010000            585*   816    930    943
BIT13 = 020000            586*   823    953   1151
BIT14 = 040000            587*   809    917   1133   1574
BIT15 = 100000            588*   798
BIT2  = 000004            575*
BIT3  = 000010            576*
BIT4  = 000020            577*  1461
BIT5  = 000040            578*  1164
BIT6  = 000100            579*
BIT7  = 000200            580*   641
BIT8  = 000400            581*  1182   1721   1768
BIT9  = 001000            582*   921    937    958    978    994  1001   1009   1016   1018   1099   1142   1154
                         1367   1692   1708   1757   1798   1805
BLAD1   005466           1360   1363*
BLOCK   001104            661*  1186   1190*  1258*  1260   1262  1263*  1264   1271*  1350*  1359   1443*  1444*
                         1445*  1446*  1447*  1448
BLSZ    005020           1185   1258*  1441
BUF     001060            651*   856*   876*   919*   932*   955*  992*  1007*  1081   1795*
BUFEXI  004630           1189   1224*
BUFINX  004656           1223   1229*
BUFOK   006076           1442*
CHKADT  002534            894    902*
CHKDAT  007430           1707*  1715
CHKDOS  003554           1045*  1055
CHKDSK  007610           1756*  1764
CHOK    007244           1658   1662*
CKCH    007214           1646   1654*
CKHRDE  004174           1133*
CLRTAB  001132            673*   676
CMDAE   004622           1200   1222*
COMDAR  004462           1191   1193*
COMPAR  005356            945   1015   1347*
CONM    001452            729*
CONTIN  004710           1235*
CONV    007020            710    769    833   1019   1023   1101  1111   1118   1127   1201   1206   1368   1372
                         1377   1382   1388   1509   1513   1526  1530   1534   1615*
CON1    010751            730   1947*
CON10   011266            819   1987*
```

DZRCB8.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
CON11   011314            812    1991#
CON2    011003            736    1952#
CON3    011036            742    1957#
CON4    011072            752    1962#
CON5    011113            762    1965#
CON6    011151            768    1971#
CON6A   011170            771     774    1974#
CON7    011201            786    1976#
CON8    011223            792    1980#
CON9    011246            805    1984#
DATAT   002570            841     910#    972
DATTES  001574            739     751#    755
DECBLK  004452           1190#
DISBUF  004412            873     902     927     950     964    1182#   1698    1714    1763    1811
DISK    003674            682    1074#
DKINT   003776            911     980    1092#
DMA     001054            649#    690#    790#    858#    861     875#    889     895     908#    986#    987#   1020    1042#
                         1075    1176#   1187#   1188    1197    1216#   1224#   1230    1349    1686#   1704#   1751#   1790#
DOWN    007470            687    1689    1721#   1725
DRVERO  003630           1053    1056#
DSKDR   001526            741#    746
DSKNOR  001100            659#    718#    719#    720#    721#    747#    748#    749#   1047
DSKNOS  004764            853    1250#
DSKRD   002740            934#    949
ELH     003000            940     943#
EMTRP   006550            680    1553#
END     011423           1059    2005#
ERADR   004532           1201#
ERCOUN  001070            655#    869#    884#    897#   1514    1535
ERRVEC= 000004           1821#   1826    1827    1828#   1829#   1835#   1836#   1849#   1850#   1858#
ERR1    002366            871#
ERR2    002454            885#
ERR3    002530            898#
ER1     002352            869#
ER2     002446            884#
ER3     002522            897#
ESH     002710            918     929#    951
EXGEN   005306           1314    1379#
EXMFLG  002234            826     839#
EXRAX   003516           1017    1032#
EXREF   005742           1420#   1424
EXTDR   004762           1228    1246#
EXTMEN  005662            678    1410#
EXTPP   003670           1057    1062    1067#
EXTPPR  003540            968    1042#
FILDAT  005146           1284#   1286
FLAG    001044            645#    669#    696#    722#    734#    740#    759#    798#    802#    809#    816#    823#    825
                          829     839     917     930     933#    935#    946     953     966     978#   1016    1018#   1043
                         1045    1054#   1056#   1060#   1076    1099#   1109    1193    1222    1226#   1245#   1250    1367#
                         1386    1865
GOTMEM  006004           1416    1426    1431#
HED1    010306           1393    1878#
HED2    010323           1106    1881#
HED4    010342           1211    1884#
HED5    010372           1518    1539    1889#
HEDSA   010370            715    1888#
```

```
HEDSX   010401          1515    1536    1891#
HED6    010403          1028    1892#
HINUM   005312          1291    1301    1315*   1321#
HRDER   001102           660#    913*    979*   1139    1688*   1706*   1753*   1796*
HRDEXI  004204          1135#
INBUF   001110           663#    876     887     932     1007    1352    1437*   1438*   1499
INCADT  002500           891#
INCSEC  004436          1187#   1192
INCTAB  010250          1098    1215    1521    1543    1865#
INTEXT  004272          1097    1141    1151#
LCONM   001452           695     728#
LDAT    002632           913     916#    928
LGMEM   005766          1413    1425#
LOGICA  003660          1063#
LONUM   005310          1290    1299    1311*   1320#
MAMF    010072           693    1824#   1859
MAXREF  005776          1417    1422    1430#
MES0    010421          1203    1212    1895#
MES1    010436          1021    1029    1120    1124    1208    1213    1370    1395    1898#
MES1A   010452          1103    1123    1901#
MES11   010610           828    1927#
MES12   010622           835     838    1929#
MES13   010625          1113    1116    1390    1394    1930#
MES2    010467          1129    1132    1904#
MES2A   010504          1907#
MES3    010521          1025    1030    1910#
MES4    010543          1374    1396    1914#
MES5    010560          1397    1540    1917#
MES5X   010563          1379    1532    1918#
MES6    010572          1398    1519    1541    1921#
MES6X   010575          1384    1511    1528    1922#
MES7    010604          1660    1925#
MES8    010606          1648    1926#
MSTR    003132           954     966#
MYBYWR  007354          1691#   1699
N       =  000004        572#    869     870#    884     885#    897     898#
NOCHA   007102           743     753     775     787     793    1635#
NODRV   011352           708    1997#
NULL    006764          1581*   1582    1584*   1594#
ODT     001014           626#
OK      010635          1814    1932#
OPDAR   001746           785#    789
OPDSEL  004322           916     929     952    1164#
OPFAT   001774           765     791#    795
OPRD    002102           808     811#
OPWCK   002130           815     818#
OPWRT   002054           797     804#
OUTBUF  011432           856     859     919     955     984     986     990     992    1281    1351    1415    1433    1437
                        1795    2009#
PARCSR= 172100          1819#   1830
PARERR  010724          1847    1943#
PARSRV  010164          1824    1846#   1857
PARVEC= 000114          1820#   1824*   1825*   1848*   1857*
PASEL   005122           915    1279#   1794
PASS    001076           658#   1460*   1468*
PASSC   001106           662#    977*   1032*   1797*   1815
```

DZRCBB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
PATHED  011337          1995#
PATMES  011333          1994#
PATNU   001056           650#   691*   799*   801*   969*   970    973*  1279   1789*
PATO    005314          1284   1324#
PATI    005316          1325#
PATIO   005334          1332#
PATI1   005336          1333#
PATI2   005340          1334#
PATI3   005342          1335#
PATI4   005344          1336#
PATI5   005346          1337#
PATI6   005350          1338#
PATI7   005352          1339#
PATI2   005320          1326#
PATI20  005354          1340#
PATI3   005322          1327#
PATI4   005324          1328#
PATI5   005326          1329#
PATI6   005330          1330#
PATI7   005332          1331#
PFT1    007312           606   1684#
PFT2    007546           607   1749#
PFWAT   007322          1686#  1688   1700   1716
POWFAL  007716          1685   1750   1787#  1796
PRIORI  001042           641#   925    941    962    982    998   1005   1013   1696   1712   1761   1802   1809
PS      001002           621#   684*   914*   925*   934*   941*   956*   962*   982*   998*  1005*  1013*  1410*
                        1638*  1696*  1712*  1761*  1802*  1809*
PWRDN   007646          1754   1768#  1772
PWRF    010702          1732   1939#
PWRFL   007556          1751#  1753   1765   1778
PWRUP   007664          1769   1772#
RANCOM  005162           985    991   1283   1290#  1318
RANER   003442           979   1016#
RANEX   003172           601    976#  1036
RANNU   001046           646#
RCBA    001026           634#  1499*
RCCS    001022           632#   698    865    867    870    878    880    882   1095   1107   1126   1133   1148*
                        1501*  1502   1721*  1768*
RCDA    001030           635#   703*   723*   883   1074   1117   1199   1205   1254*  1498*
RCDB    001034           637#
RCER    001020           631#  1100
RCLA    001016           630#
RCMR    001032           636#
RCNODV  001352           699    701    705#
RCWC    001024           633#  1140   1500*
RDSECT  002414           877#   886    903
RDWAIT  002770           938    941#
READ  = 104405           592#   877    936   1008
REDA    004120          1108   1117#
REPDRV  001366           706    710#
REPOEN  003640          1044   1048   1058#
RKNUM   011377           712    716   2001#
RORBLK  005064          1261   1265#
RTIX    006262          1452   1456*  1478#
SAVHT   002472           889#   893
SAVE    001072           656#   852*   904   1351*  1353   1363*  1376   1411*  1414*  1415   1419*  1420   1421
```

```
                    1100*  1102   1109*  1110*  1112   1117*  1119   1126*  1128   1167*  1168*  1170*  1171*
                    1172*  1173*  1174*  1175*  1176   1205*  1207   1230*  1232   1234*  1250*  1251*  1252*
                    1253*  1254   1259*  1260   1262*  1264*  1266*  1267*  1268*  1269*  1270*  1271   1280*
                    1285*  1313*  1317*  1349*  1361*  1369   1490*  1492*  1493*  1494*  1495*  1496*  1497*
                    1498   1510   1527   1662*  1663*  1670   1727*  1729*  1774*  1776*
WORK1   001114       668*   883*   995*  1186*  1235*  1348*  1356*  1359   1362*  1373   1487*  1489*  1490
                    1531
WORK2   001116       669*  1229*  1231*  1238   1347*  1355*  1357   1488*  1504
WORK3   001120       670*  1193*  1194*  1195*  1196*  1197*  1198*  1199   1202
WRCHEC= 104407       591*   957   1000   1707   1756   1804
WRDCMP  005416      1353*  1365
WRDCT   001050       647*   692*   783*   855*   860    910*   988*   989    1024   1082   1227*  1238*  1240*
                    1241*  1242*  1243*  1244*  1259   1280   1357   1435*  1439*  1440*  1793*
WRDINC  005426      1355*  1403
WRDNW   010000      1797*  1812
WRITE = 104403       590*   864    920    993   1691   1797
WRLG    003242       983*  1033
WRNEXB  002374       868    873*
WRWAIT  002672       922    925*
XESH    003124       961    964*
XINCSE  004670      1231*  1236
XINCSU  004720      1233   1238*
XINCW   006222      1465**  1466   1467   1470
XSEABU  002324       861*   863
XSLH    002702       924    927*
XTIMCN  007704      1775*  1777
XWAIT   006134       685   1452*
.     = 011434       593*   594*   596*   605*   617*   733    840    866    879    906    967    971    995
                     997   1002   1004   1010   1012   1035   1096   1137   1143   1146   1152   1155   1165
                    1183   1218   1401   1462   1469   1503   1545   1578   1644   1655   1693   1695   1709
                    1711   1758   1760   1799   1801   1806   1808   2009*
```

ERROR 616# 869 884 897

ADC	1300	1302	1304	1305	1307	1310									
ADD	702	703	969	1054	1056	1197	1225	1264	1299	1301	1303	1306	1308	1309	1363
	1364	1423	1438	1560	1597	1618	1621	1670							
ASL	1294	1833													
BCC	1834														
BEQ	701	777	797	826	840	906	918	931	954	971	1017	1035	1044	1048	1062
	1134	1137	1141	1143	1146	1152	1183	1189	1191	1200	1218	1233	1261	1283	1314
	1358	1360	1401	1412	1422	1469	1545	1569	1571	1583					
BHI	1053														
BIC	802	832	933	947	978	987	1018	1046	1060	1079	1086	1110	1168	1196	1198
	1225	1253	1262	1387	1436	1440	1489	1620	1623	1649	1663	1866			
BIS	696	722	734	740	759	798	809	816	823	1080	1099	1148	1176	1245	1254
	1367	1721	1768												
BIT	698	825	839	905	917	921	930	937	943	953	958	994	1001	1009	1016
	1034	1043	1107	1133	1136	1142	1145	1151	1154	1164	1182	1217	1260	1359	1400
	1544	1574	1657	1692	1708	1757	1798	1805							
BLOS	746	755	781	799	795										
BMI	695	1096	1413	1416											
BNE	676	699	706	733	739	765	808	815	822	863	890	893	922	938	944
	949	959	995	1002	1010	1033	1108	1165	1165	1236	1286	1298	1318	1354	1505
	1555	1564	1575	1580	1600	1628	1646	1655	1658	1693	1709	1730	1758	1777	1799
	1806														
BPL	866	868	879	881	967	1223	1467	1503	1578	1641	1644				
BR	704	750	872	874	886	894	903	924	928	940	951	961	965	997	1004
	1012	1055	1057	1192	1228	1237	1365	1403	1424	1426	1457	1470	1506	1522	1556
	1573	1586	1592	1604	1636	1653	1661	1671	1695	1699	1700	1711	1715	1760	1764
	1765	1778	1801	1808	1812	1853	1862								
CLC	756	800	1050	1169	1239	1265	1442	1491	1664	1666	1668	1867			
CLR	674	686	689	690	691	697	723	858	875	908	973	1042	1092	1216	1224
	1229	1293	1347	1348	1362	1432	1453	1460	1464	1472	1565	1639	1686	1687	1704
	1705	1751	1752	1790	1791	1850	1851								
CMP	700	732	738	745	754	764	780	788	794	796	807	814	821	889	948
	970	1047	1052	1188	1199	1232	1282	1353	1357	1415	1421	1458	1504	1554	1599
	1645	1654													
CMPB	1563	1568	1570	1579											
DEC	675	862	892	1190	1235	1285	1297	1313	1317	1584	1627				
EMT	707	714	729	735	741	751	761	767	773	785	791	804	811	818	827
	837	1027	1058	1105	1115	1122	1131	1210	1392	1475	1517	1538	1554	1602	1647
	1659	1731	1813	1846											
HALT	594	709	1138	1147	1153	1219	1402	1477	1546	1723	1770	1854	1861		
INC	779	935	1032	1187	1231	1234	1263	1355	1356	1361	1465	1468	1729	1776	1969
IOT	923	939	960	996	1003	1011	1694	1710	1759	1800	1907				
JMP	595	597	598	601	603	606	607	724	841	907	968	972	1036	1067	1097
	1139	1716	1733	1815											
JSR	678	693	710	731	737	743	753	763	769	775	787	793	806	813	820
	833	853	871	873	885	898	902	915	916	927	929	945	950	953	964
	985	991	1015	1019	1023	1063	1098	1101	1111	1118	1127	1195	1201	1206	1215
	1368	1372	1377	1382	1388	1441	1509	1513	1521	1526	1530	1534	1543	1566	1572
	1589	1591	1685	1698	1714	1750	1763	1794	1811	1859					
MOV	672	673	677	679	680	681	682	683	684	685	687	688	692	718	747
	778	782	783	790	799	829	852	854	855	856	857	859	860	861	869
	870	876	882	883	884	887	888	895	896	897	904	910	911	912	913
	914	919	925	932	934	941	946	955	956	962	976	977	979	980	981
	982	983	984	986	988	989	990	992	998	1005	1007	1013	1045	1049	1061
	1074	1075	1076	1081	1082	1084	1085	1087	1093	1100	1109	1117	1126	1135	1156
	1167	1186	1193	1205	1227	1230	1238	1250	1258	1259	1271	1279	1280	1281	1294

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        1290  1291  1292  1311  1312  1315  1316  1349  1350  1351  1352  1376  1381  1386  1410
        1411  1417  1418  1419  1431  1435  1437  1448  1452  1454  1456  1459  1461  1462  1473
        1487  1488  1490  1498  1499  1500  1501  1553  1559  1561  1581  1596  1598  1615  1616
        1617  1619  1635  1637  1638  1642  1662  1684  1688  1689  1690  1696  1706  1712  1722
        1725  1726  1727  1749  1753  1754  1755  1761  1769  1772  1773  1774  1787  1788  1789
        1792  1793  1795  1796  1802  1809  1824  1825  1826  1827  1828  1629  1830  1831  1832
        1835  1836  1848  1849  1857  1858  1865
MOVB    1562  1576  1585  1588  1590  1622
NEG     1083
NOP     1064  1065  1066
RESET    671  1728  1775  1856
ROL      720   721   748   749   757   758   801  1078  1170  1171  1172  1173  1174  1175  1195
        1240  1241  1242  1243  1244  1252  1295  1296  1443  1444  1445  1446  1447  1492  1493
        1494  1495  1496  1497  1665  1667  1669
ROR      830   831  1051  1266  1267  1268  1269  1270  1434  1439  1624  1625  1626  1650  1651
        1652  1868
RTI     1088  1094  1149  1157  1463  1474  1478  1567  1601  1829  1860
RTS     1166  1177  1184  1220  1246  1255  1272  1287  1319  1366  1449  1547  1587  1629  1656
        1837  1870
SUB      719   744  1144  1414  1425  1430  1433
SWAB    1077  1194  1251
SXT     1455
TRAP     590   591   592
TST      694   705   776   867   880   891   966  1095  1140  1420  1582  1852
TSTB     865   878  1222  1466  1502  1577  1640  1643
WAIT     926   942   963   999  1006  1014  1697  1713  1762  1803  1810
.ASCII  1878  1881  1884  1888  1889  1892  1895  1898  1901  1904  1907  1910  1914  1917  1921
        1925  1926  1927  1929  1930  1932  1933  1939  1943  1947  1952  1957  1962  1965  1971
        1974  1976  1980  1984  1987  1991  1994  1995  1997  2001  2005
.BYTE   1891  1918  1922
.ENABL   571
.END    2011
.EVEN   2008
.LIST    550   594   870   885   898
.MACR    616
.NLIST   550   594   870   885   898
.REM       1   553
.REPT    594
.TITLE   549


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 *DZRCBB,DZRCBB.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DZRCBB.P11
 RUN-TIME:  5 12 2 SECONDS
 RUN-TIME RATIO:  56/22=2.5
 CORE USED:  8K  (15 PAGES)
```

Spooler runtime 7 Seconds, 238 KCS, 139 disk reads, 3 disk writes, 59 pages