RC11

DATA TEST

MD-11-DZRCB-B

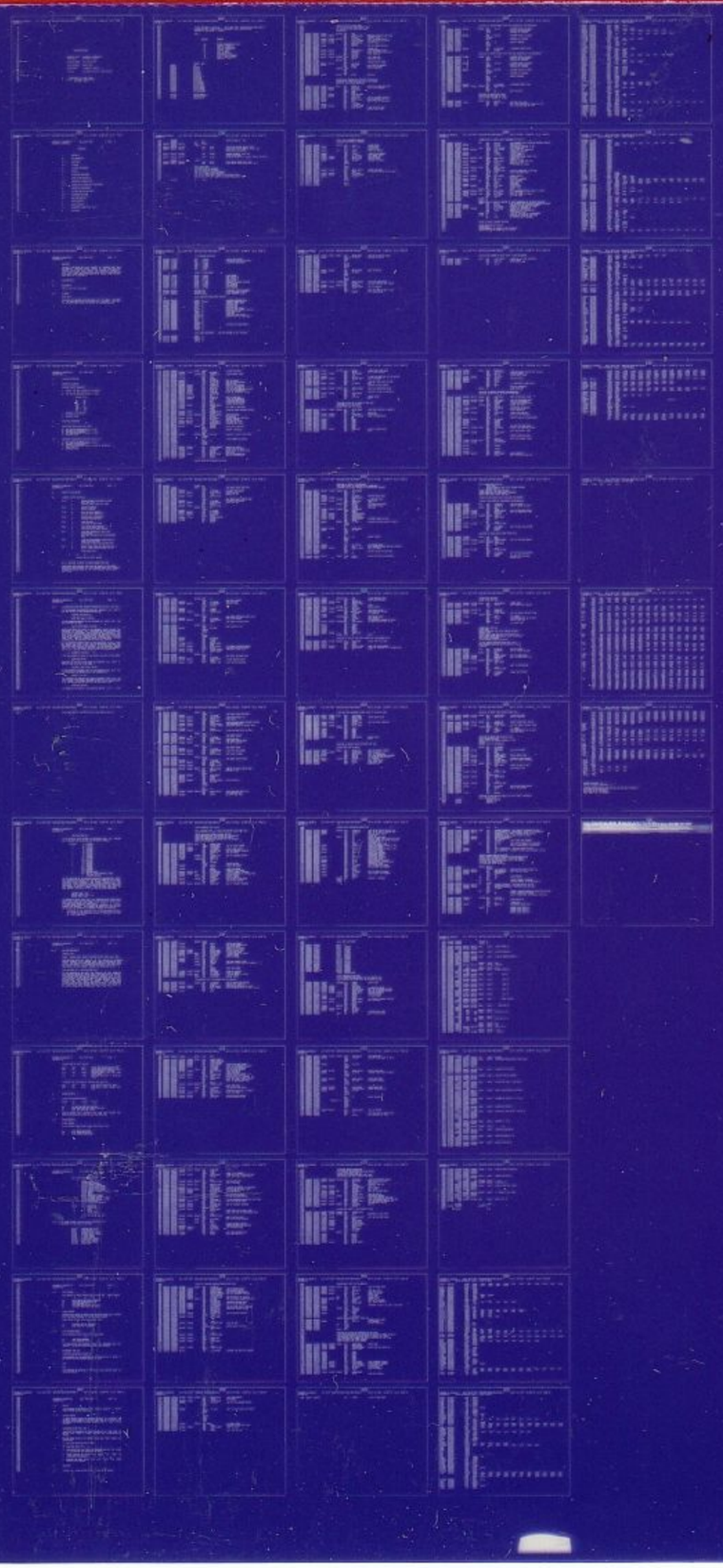
EP DZRCB B DL A

OCT 1976

digital

FICHE 1 OF 1

Made in U.S.A.



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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

CONTENTS

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

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

DESCRIPTION

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.

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                                %
                        .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
        000001          BIT1=2
        000002          BIT2=4
        000004          BIT3=10
        000010          BIT4=20
        000020          BIT5=40
        000040          BIT6=100
        000100          BIT7=200
        000200          BIT8=400
        000400          BIT9=1000
        001000          BIT10=2000
        002000          BIT11=4000
        004000          BIT12=10000
        010000          BIT13=20000
        020000          BIT14=40000
        040000          BIT15=100000
        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
```

```
                                ;CLEAR THE WORLD
                                ;CLEAR ERROR TABLE
                                ;SET UP STACK
                                ;SET UP DATA BUFFERS
                                ;RESET STACK
                                ;SET UP TTY POINTER
                                ;LOCK UP INTERRUPTS
                                ;SET UP DISK HANDLER POINTER
                                ;LOCK UP INTERRRUPTS
                                ;LOCK UP INTERRUPT LEVELS
                                ;SET UP PWR FAIL
                                ;LOCK UP INTERRUPTS
                                ;CLEAR PROGRAM FLAG
                                ;CLEAR DAR REGISTERS
                                ;CLEAR PATTER COUNT
                                ;SET PARITY SWITCHES
                                ;OPERATE UNDER PROGRAM CONTROL
                                ;TEST FOR DISK
                                ;NO DEVICE!
                                ;TESTED FOR ALL DEVICES?
                                ;REPORT NUMBER
                                ;INC DEVICE COUNT
                                ;ADDRESS NEXT DISK
                                ;TEST FOR 0 DEVICES
                                ;REPORT 0 DEVICES
                                ;CONVERT TO ASCII FOR PRINT
                                ;TYPE NUMBER OF DRIVES
                                ;SAVE # OF DISKS
                                ;FIRST DISK IS ZERO
                                ;SHIFT LEFT TO MATCH FLAG
                                ;POSITION
                                ;SET UP PROGRAM FLAG
                                ;RESET DISK ADDRESS
```

```
 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     #'S,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     #'S,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
```

```
                                                DATTES: EMT     +1
                                                        CON4                    ;ASK UNIT NUMBER
001600  004767  005276                                  JSR     %7,NOCHA        ;WAIT FOR NO.
001604  022767  000004  006470                          CMP     #4,TEXBUF       ;IS NO = OR>4
001612  101770                                          BLOS    DATTES          ;NO
001614  000241                                          CLC
001616  006167  006460                                  ROL     TEXBUF
001622  006167  006454                                  ROL     TEXBUF
001626  056767  006450  177210                          BIS     TEXBUF,FLAG

001634  104001                                  ASKWC:  EMT     +1
001636  011113                                          CON5                    ;ASK ABOUT OPTIONAL WORD COUNT
001640  004767  005246                                  JSR     %7,ALPHA        ;WAIT FOR ANSWER
001644  022767  000153  006430                          CMP     #153,TEXBUF
001652  001050                                          BNE     OPPAT           ;ASK ABOUT OPTIONAL DAR

001654  104001                                  WCCON:  EMT     +1
001656  011151                                          CON6                    ;ASK LENGTH OF WC
001660  004567  005134                                  JSR     %5,CONV
001664  001066                                          SWRDCT
001666  011170                                          CON6A
001670  000006                                          6
001672  104001                                          EMT+1
001674  011170                                          CON6A
001676  004767  005200                                  JSR     %7,NOCHA
001702  005767  006374                                  TST     TEXBUF
001706  001762                                          BEQ     WCCON
001710  016767  177152  177174                          MOV     SWRDCT,WORK
001716  005267  177170                                  INC     WORK
001722  026767  177164  006352                          CMP     WORK,TEXBUF     ;IS TEXBUF LESSTHAN SWRDCT
001730  101751                                          BLOS    WCCON           ;YES ASK FOR COUNT AGAIN
001732  016767  006344  177126                          MOV     TEXBUF,SWRDCT   ;OPERATING WORD COUNT
001740  016767  177122  177102                          MOV     SWRDCT,WRDCT

001746  104001                                  OPDAR:  EMT     +1
001750  011201                                          CON7                    ;ASK ABOUT OPTIONAL DAR
001752  004767  005124                                  JSR     %7,NOCHA
001756  022767  000100  006316                          CMP     #100,TEXBUF     ;77 MAX SECTOR COUNT
001764  101770                                          BLOS    OPDAR
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
                                                        ROR     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
```

```
                                RDSECT: READ
002414  104405                          TSTB    @RCCS           ;CHECK FOR READY
002416  105777  176400                  BPL     .-4             ;NOT READY BRANCH BACK
002422  100375                          TST     @RCCS           ;TEST FOR ERROR
002424  005777  176372                  BPL     ADHGT           ;BRANCH IF NO ERROR
002430  100014                          MOV     @RCCS,WORK      ;FETCH CONTROL REG
002432  017767  176364  176452          MOV     @RCDA,WORK1     ;FETCH DISK ADDR
002440  017767  176364  176446  ER2:    MOV     #2,ERCOUNT      ; ****** ERROR 2 ******
002446  012767  000002  176414  ERR2:   JSR     %5,STAER1       ;REPORT ERROR
002454  004567  004000                  BR      RDSECT          ;LOOP ON ERROR
002460  000755
002462  016700  176422          ADHGT:  MOV     INBUF,%0
002466  012701  000040                  MOV     #40,%1
002472  026710  176356          SANHT:  CMP     DMA,(0)         ;CMP FOR CORRECT ADDR.
002476  001004                          BNE     ADERR           ;BRANCH IF DATA DID NOT COMPARE
002500  005720                  INCADT: TST     (0)+
002502  005301                          DEC     %1
002504  001372                          BNE     SANHT           ;TEST NEXT WORD
002506  000412                          BR      CHKADT
002510  016767  176340  176376  ADERR:  MOV     DMA,WORK1       ;CORRECT ADDRESS
002516  011067  176370                  MOV     (0),WORK        ;DATA IN ERROR
002522  012767  000003  176340  ER3:    MOV     #3,ERCOUNT      ; ****** ERROR 3 ******
002530  004567  003724          ERR3:   JSR     %5,STAER1       ;REPORT ERROR

                                ;*****REPORT ONLY ONE ERROR PER SECTOR*****

002534  004767  001652          CHKADT: JSR     %7,DISBUF       ;SET UP NEXT DISK BUFFER
002540  000725                          BR      RDSECT          ;CHECK NEXT SECTOR
002542  016767  176324  176316          MOV     SAVE,SWRDCT     ;RESTORE STANDARD WORD COUNT
002550  032777  004000  176222          BIT     #BIT11,@SWR     ;DOES OPERATOR WANT TO LOOP ON TEST
002556  001402                          BEQ     .+6
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
```

N02


```
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 FOP PEPORT
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
```

```
1178                                    ;ROUTINE TO SETUP DISK BUFFERS
1179                                    ;ADD WORD COUNT TO STARTING DISK ADDRESSES
1180                                    ;COMPARE CALCULATED ADDRESS TO TERMINATING ADDRESS
1181
1182  004412  032777  000400  174360  DISBUF: BIT     #BIT8,@SWR
1183  004420  001401                    BEQ     .+4
1184  004422  000207                    RTS     %7
1185  004424  004767  000370            JSR     %7,BLSZ         ;DEFINE BLOCK SIZE
1186  004430  016767  174450  174456    MOV     BLOCK,WORK1
1187  004436  005267  174412  INCSEC:   INC     DMA             ;+1 SECTOR COUNT
1188  004442  022767  004000  174404    CMP     #4000,DMA       ;DONE YET?
1189  004450  001467                    BEQ     BUFEXIT         ;YES
1190  004452  005367  174426  DECBLK:   DEC     BLOCK           ;-1 FROM BLOCK COUNT
1191  004456  001401                    BEQ     COMDAR          ;CMP DMA TO RCDA
1192  004460  000766                    BR      INCSEC          ;RECYCLE
1193  004462  016767  174356  174430  COMDAR: MOV     FLAG,WORK3
1194  004470  000367  174424            SWAB    WORK3
1195  004474  006167  174420            ROL     WORK3
1196  004500  042767  163777  174412    BIC     #163777,WORK3
1197  004506  066767  174342  174404    ADD     DMA,WORK3
1198  004514  042767  020000  174376    BIC     #20000,WORK3
1199  004522  026777  174372  174300    CMP     WORK3,@RCDA     ;COMPARE LOWER 16 BITS
1200  004530  001434                    BEQ     CMDAE
1201  004532  004567  002262  ERADR:    JSR     %5,CONV         ;CONVERT DMA REG COUNT TO ASCII
1202  004536  001120                    WORK3
1203  004540  010421                    MES0
1204  004542  000006                    6
1205  004544  017767  174260  174340    MOV     @RCDA,WORK
1206  004552  004567  002242            JSR     %5,CONV
1207  004556  001112                    WORK
1208  004560  010435                    MES1
1209  004562  000006                    6
1210  004564  104000                    EMT     +0              ;REPORT ERROR
1211  004566  010342                    HED4
1212  004570  010421                    MES0
1213  004572  010435                    MES1
1214  004574  177777                    -1
1215  004576  004767  003446            JSR     %7,INCTAB       ;INC ERROR COUNT
1216  004602  005067  174246            CLR     DMA             ;DISK ADDRESS ERROR RESTART PROGRAM
1217  004606  032777  002000  174164    BIT     #BIT10,@SWR     ;HALT ON ERROR
1218  004614  001401                    BEQ     .+4
1219  004616  000000                    HALT                    ;SWITCH 10 SET IN SWR HALT
1220  004620  000207                    RTS     %7
1221
1222  004622  105767  174216  CMDAE:    TSTB    FLAG            ;CHECK FOR LAST DISK BUFFER
1223  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           BALD1X: 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                  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
```

N03


```
  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  172205  STAERX:  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                                    ;JSR%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,DISBUF        ;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
```

```
                    000006                          SP=     %6
                    
010072  012737  010164  000114  MAMF:   MOV     #PARSRV,@#PARVEC  ;SET PARITY INTERRUPT VECTOR
010100  012737  000340  000116          MOV     #340,@#PARVEC+2 ;AND PRIORITY LEVEL 7 ON INTERRUPT
010106  013746  000004                  MOV     @#ERRVEC,-(SP)  ;SAVE CURRENT ERROR VECTOR
010112  013746  000006                  MOV     @#ERRVEC+2,-(SP)  ;AND PRIORITY LEVEL
010116  012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC
010124  012737  000002  000006          MOV     #RTI,@#ERRVEC+2
010132  012700  172100                  MOV     #PARCSR,%0      ;GET FIRST CSR ADDRESS
010136  012702  000001                  MOV     #1,%2
010142  012720  000001          1$:     MOV     #1,(0)+         ;SET ACTION ENABLE IF AVAILABLE
010146  006302                  ASL     %2              ;SHIFT AVAILABILITY INDICATOR
010150  103374                  BCC     1$
010152  012637  000006                  MOV     (SP)+,@#ERRVEC+2  ;RESTORE ERROR VECTOR
010156  012637  000004                  MOV     (SP)+,@#ERRVEC  ;PRIORITY LEVEL AND INTERRUPT VECTOR
010162  000207                  RTS     %7

                                ;PARITY ERROR SERVICE ROUTINE
                                ;WHEN A PARITY ERROR IS DETECTED THE ROUTINE SCANS
                                ;MEMORY FOR THE PARITY ERROR.  WHEN THE ERROR
                                ;IS DETECTED THE PROGRAM HALTS WITH THE ADDRESS
                                ;CAUSING THE ERROR IN R0
                                ;TO CONTINUE PRESS CONTINUE

010164  104001          PARSRV: EMT+1
010166  010724                  PARERR
010170  012737  010216  000114          MOV     #2$,@#PARVEC    ;REPOSITION PARITY ERROR INT.
010176  012737  010244  000004          MOV     #4$,@#ERRVEC    ;SET TIME OUT TRAP
010204  005037  000006                  CLR     @#ERRVEC+2
010210  005000                  CLR     %0
010212  005720          1$:     TST     (0)+            ;SCAN MEMORY
010214  000776                  BR      1$
010216  000000          2$:     HALT                    ;PARITY ERROR - ADDRESS
                                                        ;CAUSING ERROR IS IN REGISTER 0
010220  000005          3$:     RESET
010222  012737  010164  000114          MOV     #PARSRV,@#PARVEC  ;RESTORE PARITY VECTOR
010230  012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC  ;RESTORE TIME OUT HALT
010236  004767  177630                  JSR     %7,MAMF
010242  000002                  RTI
010244  000000          4$:     HALT                    ;ERROR - PARITY ERROR NOT DETECTED ON SCAN
010246  000764                  BR      3$              ;4(SP) CONTAINS PC WHERE
                                                        ;PARITY ERROR WAS  ORIGINALLY DETECTED

010250  016703  170570  INCTAB: MOV     FLAG,%3
010254  042703  177763          BIC     #177763,%3      ;MASK DRIVE NO
010260  000241                  CLC
010262  006003                  ROR     %3              ;NORMALIZE
010264  005263  010272          INC     TABLE(3)        ;INCREMENT ERROR COUNT
010270  000207                  RTS     %7
010272  000000          TABLE:  0                       ;ERROR COUNT DRIVE 0
010274  000000                  0                       ;ERROR COUNT DRIVE 1
010276  000000                  0                       ;ERROR COUNT DRIVE 2
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  011366  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#
BALDIX  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#
```

DZRCBB.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   1319#
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#
HEDS    010372         1518   1539   1889#
HEDSA   010370          715   1888#
```

```
HED5X   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    010435          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#
OPPAT   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*   1787*   1815
```

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PATHED  011337          1995#
PATMES  011333          1994#
PATNU   001056           650#   691*   799*   801*   969*   970    973*  1279   1789*
PATO    005314          1284   1324#
PAT1    005316          1325#
PAT10   005334          1332#
PAT11   005336          1333#
PAT12   005340          1334#
PAT13   005342          1335#
PAT14   005344          1336#
PAT15   005346          1337#
PAT16   005350          1338#
PAT17   005352          1339#
PAT2    005320          1326#
PAT20   005354          1340#
PAT3    005322          1327#
PAT4    005324          1328#
PAT5    005326          1329#
PAT6    005330          1330#
PAT7    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#
RANDOM  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#
SANHT   002472           889#   893
SAVE    001072           656#   852*   904   1351*  1353   1363*  1376   1411*  1414*  1415   1419*  1420   1421
```

DZRCBB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
                    1423*  1425*  1430*  1433*  1434*  1435   1436*  1438
SAV1      001074     657#  1352*  1353   1364*  1381
SEABUF    002314     859#   872    874
SETADT    002406     876#
SHIFT     005200    1294#  1298
SLH       003046     931    952#   965
SOFTER    004226    1134   1140#
SP      =X000006    1822#  1826*  1827*  1835   1836
SPECOR    001314     698#   704
SRCHG     006404    1504#  1506
STAER     006416     871   1509#
STAERX    006534    1522   1544#
STAER1    006460     885    898   1526#
START     001122     595    671#
STATUS    001040     640#   912*   981*
SWR       001000     620#   694    905    921    937    943    958    994   1001   1009   1034   1136   1142
                    1145   1151   1154   1164   1167   1182   1217   1400   1487   1488   1504   1544   1574
                    1692   1708   1757   1798   1805
SWRDCT    001066     654#   692    770    778    782*   783    852    854*   904*   910    1227   1448*  1792*
                    1793
TABLE     010272     673   1052   1869*  1871#
TDMA      001064     653#
TEXBUF    010302     697*   700    702*   705    711    718    732    738    744*   745    747    754    757*
                     758*   759    764    776    780    782    788    790    794    796    799    807    814
                     821   1639*  1649*  1650*  1651*  1652*  1665*  1667*  1669*  1670*  1875#
TIMCNT    007526    1728#  1730
TIMO      010642    1476   1933#
TKB       001006     623#  1642   1645   1654   1657   1662
TKS       001012     625#  1640
TKSEL     006264     603   1487#  1505
TPB       001004     622#  1576*  1642*
TPS       001010     624#  1577   1643
TRACK     001052     648#  1687*  1705*  1752*  1791*
TSTCH     010304    1635*  1637*  1657   1876#
TSTFLG    007132    1640#  1641   1653   1661   1671
TWRDCT    001062     652#
TYEXIT    006732    1575   1583   1587#
TYP       006562    1556   1559#
TYPA      006572    1562#  1573   1592
TYPC      006620    1564   1568#
TYPD      006646    1566   1572   1574#  1586   1589   1591
TYPDAT    006762    1562*  1563   1565*  1568   1570   1576   1579   1585*  1588*  1590*  1593#
TYPF      006734    1569   1588#
TYPG      006746    1571   1590#
TYPS      006766    1555   1596#  1604
TYPSA     007012    1600   1602#
TYPSB     007014    1598*  1599   1603#
TYST      007120    1636   1638#
UP        007506    1722   1725#
UPCHK     007412    1704#  1706   1733
VECTOR    001036     639#   911*   980*
WCCON     001654     767#   777    781
WCWAIT    003114     959    962#
WDERR     005506    1354   1367#
WORK      001112     667#   672*   675*   778*   779*   780    870*   882*   896*   946*   947*   948    983*
                     989*  1045*  1046*  1047   1049   1076*  1077*  1078*  1079*  1080   1085*  1086*  1087
```

```
                    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   2008*
```

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
        1226  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   789   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  1458  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  1869
IOT      923   939   960   996  1003  1011  1694  1710  1759  1800  1807
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   952   964
         985   991  1015  1019  1023  1063  1098  1101  1111  1118  1127  1185  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  1284
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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)
```

IO5

Spooler runtime 7 Seconds, 232 KCS, 199 disk reads, 3 disk writes, 59 pages