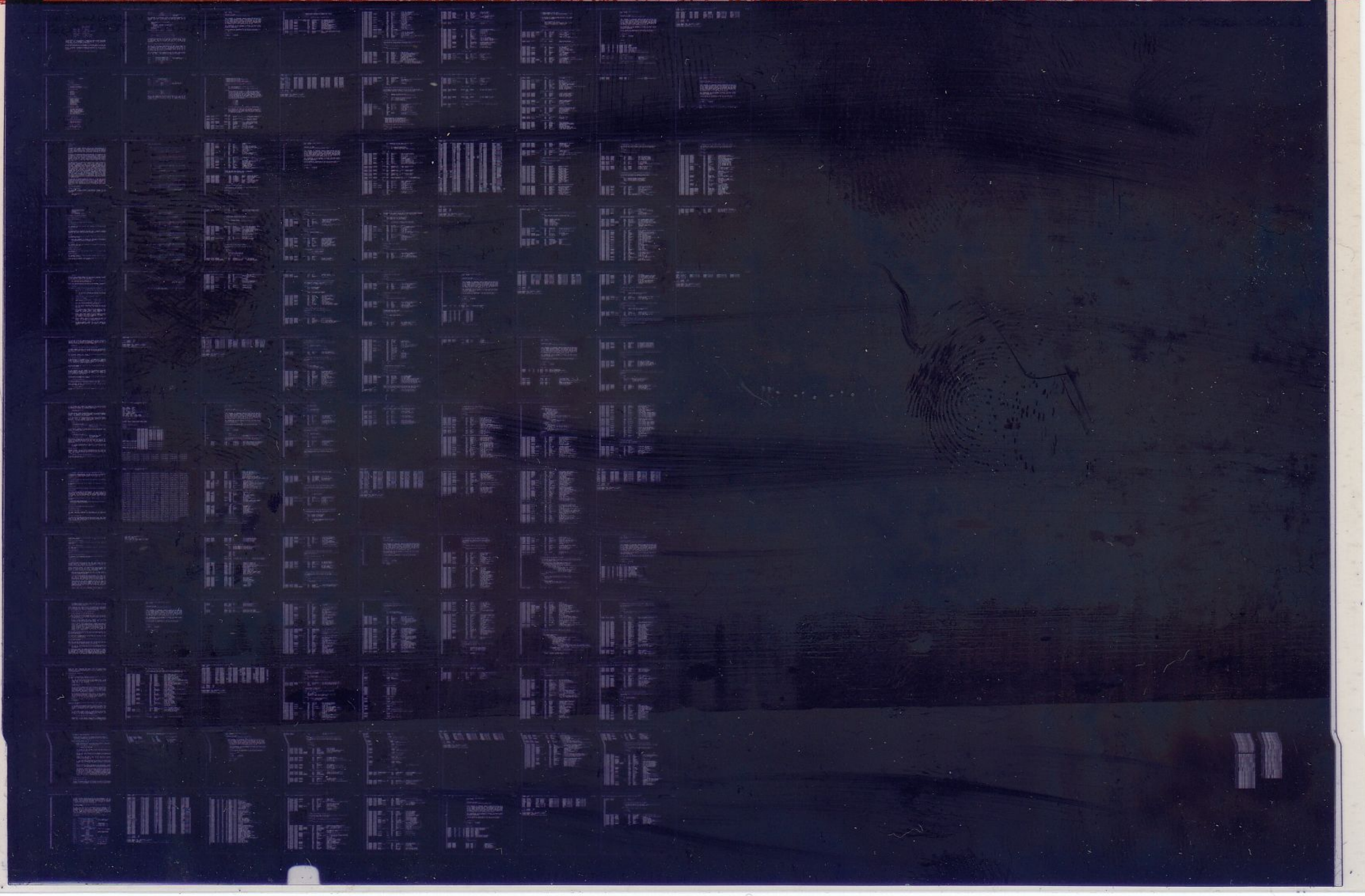
RM80

RM80 FORMATTER
CZRNJA0

AH-T123A-MC
FICHE 1 OF 1



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IDENTIFICATION

PRODUCT CODE: AC-T122A-MC

PRODUCT NAME: CZRNJA0 RM80 FORMATTER

PRODUCT DATE: JANUARY 1982

MAINTAINER: CX DIAGNOSTIC GROUP

AUTHOR: C. HESS, M. LEAVITT

CONTENTS

1.0 INTRODUCTION

1.1 ABSTRACT

THE RM80 FIELD FORMAT PROCESS FOR 16 BIT APPLICATIONS IS A RECONSTRUCTION PROCESS THAT RE-ESTABLISHES THE FACTORY FORMAT OF THE HDA. THE FORMATTER IS NOT INTENDED TO BE USED BY FIELD SERVICE AS RM80 TROUBLE SHOOTING TOOL; ALSO, HDAS SHOULD NOT BE FORMATTED UNLESS THE EXISTING FORMAT HAS BEEN DAMAGED BY HARDWARE OR SOFTWARE FAILURES.

BECAUSE OF THE TECHNOLOGY USED IN THE RM80 HDA, IT IS EXPECTED THAT THE NUMBER OF DEFECTS (BAD SECTORS) WILL EXCEED THE NUMBER OF BAD SECTORS THAT THE 16 BIT FILE SYSTEMS CAN ACCEPT. SKIP SECTORING WAS ADDED TO THE RM80 TO REDUCE THE APPARENT NUMBER OF BAD SECTORS: SKIPPED SECTORS ARE VISIBLE ONLY TO THE HOST OPERATING SYSTEM'S RM80 DEVICE DRIVER. (THE FILE SYSTEM VISIBLE DEFECTS ARE LISTED IN THE DEC STD 144 MFG AND USER'S FILES, MDBSF AND UDBSF, RESPECTIVELY.)

THE RM80 HDA MEDIA IS VERIFIED IN MANUFACTURING USING PARAMETERIC VERIFICATION EQUIPMENT. THE DEFECT LIST GENERATED BY THE MANUFACTURING VERIFCATION PROCESS IS THE MASTER LIST OF DEFECTS ON THE HDA. EXPERIENCE WITH PREVIOUS DISK PRODUCTS INDICATES THAT FUNCTIONAL FORMAT/VERIFICATION PROGRAMS CANNOT PERFORM ADEQUATE MEDIA VERIFICATION AND WILL MISS A LARGE NUMBER OF THE DEFECTS WHICH ARE PRESENT. SINCE ONLY A FEW OF THE ACTUAL DEFECTS WHICH ARE PRESENT ARE DETECTED BY A FUNCTIONAL FORMAT/VERIFICATION PROGRAM, MARKING THE ERRORS DISCOVERED BY SUCH A VERIFICATION PROGRAM WILL, IN EFFECT, CREATE AN HDA WHICH HAS A HIGHER APPARENT ERROR RATE THAN IT HAD INITIALLY. CONSEQUENTLY, THE FIELD FORMATTER WILL NOT RELY ON FUNCTIONAL MEDIA VERIFICATION ALONE. THE FIELD FORMAT OPERATION WILL BE BASED ON THE HDA'S 16 BIT MODE BAD SECTOR FILES SUPPORTED BY INCIDENTIAL MEDIA VERIFICATION. FUNCTIONAL MEDIA VERIFICATION, ALTHOUGH LIMITED, WILL BE ATTEMPTED AS A MEANS OF DETECTING DEFECTS WHICH HAVE DEVELOPED SINCE THE HDA LEFT MANUFACTURING.

THE LOCATIONS OF SKIPPED SECTORS ARE LISTED IN A NEW BAD SECTOR SUPPORT FILE CALLED THE SKIPPED SECTOR FILE (SSF). THE LOCATIONS OF SKIPPED SECTORS ARE NECESSARY SO THAT A FIELD FORMAT PROGRAM CAN RECONSTRUCT (SEE SECTION 7) THE FACTORY FORMAT OF AN HDA. THE NON-SKIPPED SECTOR LOCATIONS ARE LISTED IN THE DEC STD 144 FILES. THESE FILES ARE CREATED/INITIALIZED BY THE MANUFACTORING FORMAT PROCESS.

2.0 OPERATING REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

THE FOLLOWING MINIMUM HARDWARE CONFIGURATION, ASSUMED TO BE OPERATIONAL, IS REQUIRED TO LOAD AND EXECUTE THE RM80 SUBSYSTEM FORMATTER:

PDP-11/70 PROCESSOR
28K MEMORY

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                                KW11-L OR KW11-P CLOCK
                                PROGRAM LOADING DEVICE
                                TERMINAL
                                RH70 CONTROLLER
                                1 TO 8 RM80 DISK DRIVES

        2.2  PREREQUISITE DIAGNOSTIC PROGRAMS

             RM80 DISKLESS TEST, PART 1 AND 2

        3.0  OPERATING PROCEDURE

        3.1  LOADING

             THE PROGRAM MAY BE LOADED FROM ANY XXDP MEDIA.

        3.2  SWITCH OPTIONS

             THE  PROGRAM  DOES  NOT  SUPPORT  ANY  HARDWARE  OR SOFTWARE SWITCH
             REGISTER OPTIONS.

        3.3  STARTING

             THE PROGRAM MUST BE STARTED AT  LOCATION  200  .  HOWEVER,  BECAUSE
             LOCATION  200  GETS  OVER WRITTEN BY THE RSX11 MONITOR, THE PROGRAM
             CANNOT BE RESTARTED AFTER ITS INITIAL STARTUP.

        3.4  HALTING

             THE PROGRAM CAN BE HALTED  BY  PRESSING  THE  HALT  SWITCH  ON  THE
             PROCESSOR FRONT PANEL.

             NOTE: ONCE  THE  PROGRAM  IS  HALTED,  IT  CAN ONLY BE RESTARTED BY
                   PRESSING CONTINUE ON THE PROCESSOR FRONT PANEL  OR  RELOADING
                   THE PROGRAM AND STARTING AT ADDRESS 200 .

        3.5  RESTARTING

             THE  PROGRAM  CAN  ONLY  BE  RESTARTED BY RELOADING THE PROGRAM AND
             STARTING AT ADDRESS 200 .

        4.0  OPERATOR INTERFACE

        4.1  PROGRAM IDENTIFICATION

             THE PROGRAM TYPES ITS TITLE THE FIRST  TIME  IT  IS  STARTED  AFTER
             BEING LOADED.

        4.2  CONSOLE DIALOGUE

             THE  PROGRAM  ENTERS  A  CONSOLE DIALOGUE SEQUENCE AFTER TYPING THE
             PROGRAM IDENTIFICATION.

             UPON STARTING THE PROGRAM, THE FOLLOWING PROMPT WILL ASK  THE  USER
             TO SPECIFY WHICH DRIVE IS TO BE FORMATTED.
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                        'DRIVE #: '

ENTER THE DRIVE ADDRESS NUMBER (0-7) FOLLOWED BY  CARRIAGE  RETURN.
IF  THE  SELECTED  DRIVE IS NOT AVAILABLE, THE PROGRAM WILL TYPE AN
ERROR MESSAGE AND RETURN TO THE THIS PROMPT.

NOTE: ONLY ONE DRIVE CAN BE FORMATTED AT A TIME.  THIS PROGRAM DOES
      NOT ALLOW MULTIPLE DRIVE FORMATTING.

AFTER  THE USER HAS SELECTED THE DRIVE TO BE FORMATTED, THE PROGRAM
WILL ASK FOR AN OPTION TO BE SELECTED WITH THE FOLLOWING PROMPT.

      'OPTIONS: '

THE COMMANDS AVAILABLE FOR THE OPTION PROMPT ARE AS FOLLOWS:

      IN     INITIALIZE  ALL  THE BAD SECTOR FILES (DEC STD 144 AND
             SSF).

             NOTE: THE INITIALIZE COMMAND WILL DESTROY THE CONTENTS
                   OF  ALL  THE  BAD  SECTOR FILES (DEC STD 144 AND
                   SSF).

      FO     FORMAT THE DISK.  (ALL CYLINDERS 0 - 560.)

      <CR>   SAME AS 'FO' COMMAND.

      FO:F   FORMAT THE FE CYLINDERS ONLY.  (CYL 559., TRK 2 -  CYL
             560., TRK 13.)

      LI     LIST  THE  PHYICAL ADDRESSES OF THE DEFECTS IN ALL THE
             BAD SECTOR FILES (DEC STD 144 FILES AND SSF).

      LI:L   LIST THE LOGICAL ADDRESSES OF THE DEFECTS IN  THE  DEC
             STD  144  FILES.   (SSF  DOES  NOT CONTAIN ANY LOGICAL
             ADDRESSES)

      VFL=N  VERIFY SECTOR COUNT, WHERE 'N' IS THE NUMBER OF  TIMES
             TO  RE-READ  A  TRACK  DURING  VERIFY  OPERATION.  THE
             DEFAULT IS 1 (RANGE  1-256.).   AFTER  COMPLETING  THE
             FORMAT, 'N' WILL RETURN TO ITS DEFAULT VALUE.

      ERL=N  ERROR  LIMIT  COUNT, WHERE 'N' IS THE NUMBER OF ERRORS
             ALLOWED BEFORE THE FORMAT IS ABORTED.  THE DEFAULT  IS
             256  (RANGE  1-256.). AFTER COMPLETING THE FORMAT, 'N'
             WILL RETURN TO ITS DEFAULT VALUE.

      CSR=N  RM BASE ADDRESS, WHERE 'N' IS THE ADDRESS OF RMCS1  IN
             OCTAL.   THE  DEFAULT  IS 176700. AFTER COMPLETING THE
             FORMAT, 'N' WILL RETAIN ITS CHANGED VALUE.

      VEC=N  RM  VECTOR  ADDRESS,  WHERE  'N'  IS  THE  ADDRESS  OF
             INTERRUPT ADDRESS IN OCTAL.  THE DEFAULT IS 254. AFTER
             COMPLETING THE FORMAT, 'N'  WILL  RETAIN  ITS  CHANGED
             VALUE.
```

THE USER MAY STRING ANY COMBINATION OF COMMAND OPTIONS TOGETHER BY USING A SLASH (/) TO SEPARATE THE COMMANDS. HOWEVER, IF ONLY A CARRIAGE RETURN IS TYPE FOR THE OPTION PROMPT, THE PROGRAM WILL GO INTO FORMAT (FO) MODE USING THE DEFAULT PARAMETERS.

EXAMPLE #1:

OPTION:FO/CSR=176000/VEC=260/VFL=3/ERL=10<CR>

THE ABOVE COMMAND INDICATES THAT THE ENTIRE DISK WILL BE FORMATTED, THE RMCS1 ADDRESS WILL BE SET TO 176000, THE VECTOR ADDRESS WILL BE SET TO 260, THE VERIFY COUNT WILL BE SET TO 3 AND ERROR LIMIT WILL BE SET TO 10.

THE FOLLOWING PROMPT WILL OCCUR IF THE OPTION SPECIFIED WAS AN INITIALIZE (IN) OR FORMAT (FO) COMMAND.

'CONTINUE (L) N ? '

IF THE RESPONSE TO THIS PROMPT IS A 'N' FOLLOWED BY A CARRIAGE RETURN OR JUST A CARRIAGE RETURN, THE PROGRAM WILL ABORT THE CURRENT COMMAND AND RETURN TO THE DRIVE PROMPT. IF THE RESPONSE IS A 'Y' FOLLOWED BY A CARRIAGE RETURN, THE PROGRAM WILL CONTINUE TO THE NEXT STEP IN THE CURRENT COMMAND OPTION.

THE FOLLOWING PROMPT WILL OCCUR IF THE OPTION SPECIFIED WAS A FORMAT (FO) COMMAND.

'UPDATE MODE (L) N ? '

IF THE RESPONSE TO THIS PROMPT IS A 'N' FOLLOWED BY A CARRIAGE RETURN OR JUST A CARRIAGE RETURN, THE PROGRAM WILL ABORT THE CURRENT COMMAND AND RETURN TO THE DRIVE PROMPT. IF THE RESPONSE IS A 'Y' FOLLOWED BY A CARRIAGE RETURN, THE PROGRAM WILL ENTER THE MANUAL BAD SECTOR UPDATE ROUTINE.

THE FOLLOWING TWO PROMPTS WILL OCCUR IF THE OPTION SPECIFIED WAS AN INITIALIZE (IN) OR FORMAT (FO) COMMAND.

'ENTER DATE (DD-MMM-YY): '

THE DATE IS ENTERED BY TYPING A DAY IN DECIMAL, THE FIRST 3 LETTERS OF THE MONTH AND THE LAST TWO DECIMAL DIGITS OF THE YEAR.

AFTER ENTERING THE DATE, THE PROGRAM WILL PROMPT THE USER FOR THE HDA SERIAL NUMBER AS FOLLOWS:

'HDA SERIAL NUMBER: '

THE HDA SERIAL NUMBER CAN BE ANY DECIMAL NUMBER UP TO 10. DIGITS IN LENGTH.

IF THE OPTION WAS A FORMAT (FO) COMMAND AND THE USER HAS ENTERED THE MANUAL UPDATE MODE, THE FOLLOWING PROMPT WILL BE TYPED TO ALLOW THE ENTERING OF SECTORS INTO THE BAD SECTOR FILES.

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'ENTER BAD SECTR ADRS:
 CYL,TRK,SEC = '
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THE BAD SECTOR ENTRY IS ENTERED BY TYPING THE CYLINDER ADDRESS, TRACK ADDRESS AND SECTOR ADDRESS IN DECIMAL, FOLLOWED BY A CARRIAGE RETURN. TO TERMNATE THE BAD SECTOR ENTRY LIST, TYPE A CARRIAGE RETURN IN RESPONSE TO THE ENTRY PROMPT.

IF THE BAD SECTOR HAS A HEADER ERROR OR DRIVE TIMING ERROR (EXAMPLE #2), THE LETTER 'H' (HEADER DEFECT) MUST FOLLOW THE DEFECT INDICATED. THIS WILL INDICATE TO THE PROGRAM, WHICH FILE (SSF OR DEC STD 144) THE DEFECT MUST BE STORED IN.

EXAMPLE #1:

```
ENTER BAD SECTR ADRS:
CYL,TRK,SEC = 525,4,25<CR>   ;DEFECT  CYL 524., TRK 4., SEC
                              25.
CYL,TRK,SEC = <CR>           ;TERMINATE INPUT
```

IF THIS DEFECT (EXAMPLE #1) IS NOT ALREADY IN THE SKIP SECTOR FILE (SSF), THE DEFECT WILL BE ENTERED AS A SKIP SECTOR ENTRY. (SEE SECTION 7.0 FOR MORE DETAILS)

EXAMPLE #2:

```
ENTER BAD SECTR ADRS:
CYL,TRK,SEC = 525,4,25H<CR>  ;DEFECT CYL 524., TRK 4., SEC
                              25. (HEADER ERROR)
CYL,TRK,SEC = <CR>           ;TERMINATE INPUT
```

THIS SECTOR (EXAMPLE #2) WILL NOT BE ENTERED AS A SKIPPED SECTOR, BECAUSE A HEADER ERROR WAS FLAGGED BY THE USER, BY PLACING THE LETTER 'H' AFTER THE DEFECT. THE DEFECT WILL BE ENTERED IN THE MANUFACTURES SECTION OF THE DEC STD 144 FILE. (SEE SECTION 7.0 FOR MORE DETAILS)

NOTE: THE LETTER LOCATED WITHIN THE BRACKETS () INDICATES THE TYPE OF RESPONSE REQUIRED BY THE USER, D=DECIMAL, O=OCTAL AND L=LETTER.

4.3 WARNING MESSAGES

WARNING MESSAGES WILL BE TYPED AT THE APPROPRIATE TIME DURING THE PROGRAM TO NOTIFY THE USER THAT THE CONTENTS OF THE HDA WILL BE LOST. THE FOLLOWING MESSAGE WILL BE TYPED BEFORE INITIALIZING OR FORMATTING THE HDA.

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'** WARNING - DATA WILL BE LOST ON DRN: **'
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TO FURTHER WARN THE USER, THE FOLLOWING MESSAGE WILL BE TYPED JUST BEFORE INITIALIZING THE HDA.

'** WARNING - BAD SECTOR FILES WILL BE OVERWRITTEN ON DRN: **'

FOLLOWING EACH WARNING MESSAGE, THE USER IS ALLOWED THE OPPORTUNITY TO TERMINATE THE PROGRAM WITHOUT DESTROYING THE DATA ON HDA, BY RESPONSING TO A PROGRAM PROMPT MESSAGE. (SEE SECTION 4.2)

4.4 PROGRESS REPORTS

NO PROGRESS REPORTS ARE GIVEN DURING THE EXECUTION OF THE PROGRAM.

4.5 PERFORMANCE REPORT

NO PERFORMANCE REPORTS ARE GIVEN DURING THE EXECUTION OF THE PROGRAM.

4.6 PROGRAM HALTS

THERE ARE NO SCHEDULED HALTS DURING THE EXECUTION OF THE PROGRAM.

4.7 ERROR REPORTS

THE FIRST LINE CONTAINS THE ERROR MESSAGE: ONE LINE OF TEXT WHICH GIVES A BRIEF DESCRIPTION OF THE ERROR. THE ERROR MESSAGE IS FOLLOWED BY ONE LINE CONTAINING DATA HEADERS AND DATA PERTININENT TO THE ERROR. THE LAST LINE CONTAINS THE DECIMAL REQUIVALENT OF THE RMDC AND RMDA REGISTERS, WHICH INDICATE WHERE THE ERROR OCCURED.

THE FOLLOWING PRINTOUT SHOWS A TYPICAL ERROR MESSAGE FOR THIS PROGRAM:

```
   HEADER/DATA ERROR DURING VERIFY
   RMCS1=144252 RMCS2=040300 RMER1=100000 RMER2=000000 RMDA=001014
   CYLINDER=559. TRACK=2. SECTOR=11.
```

4.8 EXECUTION TIME

ONE PASS OF THE PROGRAM TAKES ABOUT 20 MINUTES.

5.0 ENVIRONMENTAL SUPPORT

5.1 PROCESSOR COMPATIBILITY

THE RM80 SUBSYSTEM FORMATTER IS EXECUTABLE ON A PDP-11/70 PROCESSOR, PROVIDING PREVIOUSLY MENTIONED HARDWARE REQUIREMENTS ARE MET.

5.2 DUAL PORT CONFIGURATIONS

THE RM80 SUBSYSTEM FORMATTER DOES NOT SPECIFICALLY TEST DUAL PORT LOGIC IN THE RM80 ADAPTER BUT IS EXECUTABLE ON RM80 SUBSYSTEMS HAVING THE DUAL PORT OPTION PROVIDING THE DUAL PORT SWITCH IS SET TO THE APPROPRIATE PORT (A OR B).

5.3 MEMORY PARITY HARDWARE

MEMORY PARITY HARDWARE IS NOT USED DURING THE EXECUTION OF THE RM80 SUBSYSTEM FORMATTER.

5.4 MEMORY MANAGEMENT HARDWARE

MEMORY MANAGEMENT HARDWARE IS NOT USED DURING THE RM80 SUBSYSTEM FORMATTER.

5.5 ACT11, APT11 COMPATIBILITY

THE RM80 SUBSYSTEM FORMATTER IS COMPATIBLE WITH ACT11 AND APT11 IN DUMP MODE ONLY.

5.6 XXDP COMPATIBILITY

THE RM80 SUSBYSTEM FORMATTER IS COMPATIBLE WITH XXDP IN DUMP MODE ONLY.

5.7 OPERATING SYSTEM COMPATIBILITY

THE PROGRAM IS NOT COMPATIBLE WITH ANY OPERATING SYSTEM WHEN IT IS ASSEMBLED AS AN XXDP STANDALONE PROGRAM.

6.0 FORMAT DESCRIPTION

6.1 FORMAT PROCESS

THE FORMATTER USES THE DEC STD 144 MFG AND USER FILES AND THE SKIPPED SECTOR FILE TO RECONSTRUCT (SEE SECTION 7) AN HDA'S 16 BIT FACTORY FORMAT AND ATTEMPTS TO FIND ADDITIONAL DEFECTS BY PERFORMING A FUNCTIONAL MEDIA VERIFICATION.

BEFORE FORMATTING BEGINS, THE FORMATTER WILL READ AND VERIFY THE DEC STD 144 FILES AND THE SSF FILE. THESE FILES CONTROL THE MARKING OF KNOWN DEFECTS ON THE HDA. THE PROGRAM WILL READ AND VERIFY THE DEFECT FILES USING THE FOLLOWING PROCEDURE:

1. EACH COPY OF THE SKIPPED SECTOR FILE (SSF) IS READ UNTIL A GOOD READ OCCURS AND THE HEADER AND DATA FIELDS ARE VALIDATED USING THE INTERNAL CHECKSUMS.

2. STARTING WITH THE PRIMARY DEC STD 144 TRACK (CYL 558., TRK 13.) AND CONTINUING TO THE SECONDARY DEC STD 144 TRACK (CYL 559., TRK 1.), THE PROGRAM WILL READ EACH COPY OF THE 16 BIT MANUFACTURING AND USER'S DEC STD 144 FILE UNTIL A GOOD READ OCCURS AND THE INTERNAL FORMAT OF EACH FILE IS VALIDATED.

3. VERIFY THAT THE HDA SERIAL NUMBERS IN THE DEC STD 144 (MANUFACTURING AND USER) FILE AGREE WITH THE SERIAL NUMBER IN THE SSF. IF THE SERIAL NUMBER IN THE DEC STD 144 (MANUFACTURING OR USER) FILE DOES NOT COMPARE WITH THE SERIAL NUMBER IN THE SSF, THEN THE NEXT COPY OF THE FILE IN ERROR IS READ AND VALIDATED.

4. VERIFY THAT THE DISK ADDRESSES IN THE DEC STD 144 (MANUFACTURING AND USER) FILE ARE VALID RM80 ADDRESSES. IF

AN ADDRESS ERROR IS FOUND, THE FILE IN ERROR WILL BE CONSIDERED CORRUPTED AND THE NEXT COPY OF THE FILE IN ERROR WILL BE READ AND VALIDATED.

AFTER VERIFYING THE DEFECT FILES, THE PROGRAM WILL THEN FORMAT (WRITE HEADER AND DATA) AND VERIFY (WRITE CHECK HEADER AND DATA) ALL 32 SECTORS OF EACH TRACK IN 16 BIT MODE USING THE FOLLOWING 32 BIT DATA PATTERN TO FILL THE DATA FIELD OF EACH SECTOR.

155555 133333 (OCTAL) OR DB6DB6DB (HEX)

THE FOLLOWING SEQUENCE IS USED FOR FORMATTING:

1. THE SKIPPED SECTOR ERROR INHIBIT BIT (SSEI), BIT 09 IN THE RMOF REGISTER, IS SET BEFORE EACH WRITE OR READ OPERATION. SETTING THIS BIT, IN 16 BIT MODE, ALLOWS ACCESS TO ALL 32 SECTORS ON THE TRACK.

   USING A WRITE HEADER AND DATA COMMAND, EACH TRACK (32 SECTORS) IS FORMATTED IN 16 BIT MODE USING THE ABOVE DATA PATTERN FOR THE DATA PORTION OF EACH SECTOR.

2. USING A WRITE CHECK HEADER AND DATA COMMAND, EACH TRACK IS READ 1 TIME. IF A DATA ERROR OCCURS AT A SECTOR WHICH IS NOT LISTED IN EITHER THE 16 BIT DEC STD 144 FILE OR THE SSF, THE SECTOR IS READ 20 TIMES. IF A DATA ERROR OCCURS DURING THE REREAD SEQUENCE, THE SEQUENCE IS DISCONTINUED, AND THE ADDRESS OF THE FAILING SECTOR IS SAVED IN THE APPROPRIATE DEFECT LIST. THE PROGRAM THEN CONTINUES CHECKING THE REMAINDER OF THE TRACK.

AFTER A TRACK HAS BEEN VERIFIED, THE TRACK IS REFORMATTED WITH THE BAD SECTOR MARKINGS BASED ON THE PREVIOUSLY DETECTED ERRORS AND ANY NEWLY DETECTED ERRORS.

THE PRIMARY AND SECONDARY DEC STD 144 TRACKS (CYL 558, TRK 13 AND CYL 559 TRK 1, RESPECTIVELY), THE SSF TRACK (CYL 559,TRK 0), AND THE FE AREA WILL BE REFORMATTED.

THE SSF REVISION NUMBER AND DATE WILL BE UPDATED ONLY IF THE SSF FILE HAS BEEN UPDATED.

BOTH THE SSF AND THE DEC STD 144 FILES WILL BE SORTED SO THAT THE DEFECT ENTRIES ARE IN ASCENDING ORDER. THE 16 BIT DEC STD 144 FILES AND THE SKIPPED SECTOR FILES WILL BE REWRITTEN.

NOTE: THE 18 BIT MODE DEFECT DEC STD 144 FILE RECORDS AND THE 18 BIT MODE SSF WILL BE REPLACED BY NULL RECORDS DURING A 16 BIT MODE FORMAT.

IF, DURING THE FORMAT, THE NUMBER OF NEWLY DETECTED DEFECTS CAUSES THE TOTAL NUMBER OF DEFECTS IN THE MDBSF AND THE UDBSF TO EXCEED THE MAXIMUM, THE PROGRAM DISCONTINUES THE FORMAT AND DISPLAYS AN ERROR MESSAGE TO THIS EFFECT. THE PROGRAM THEN RESTARTS THE FORMAT PROCESS USING ONLY THE BAD SECTOR INFORMATION ALREADY IN THE MDBSF, UDBSF, AND THE SSF. THE FORMATTER, UNDER THESE CIRCUMSTANCES, WILL

WRITE THE TRACK STRUCTURE AND VERIFY THAT THE WRITE OCCURED CORRECTLY, ONLY - NO MEDIA VERIFICATION WILL BE ATTEMPTED. THE OPERATOR WILL MAKE THE DETERMINATION IF THE HDA IS DEFECTIVE AND IF IT IS TO BE REPLACED.

7.0 RECONSTRUCTION DESCRIPTION

7.1 OLD DEFECTS

THE TRACK IS RECONSTRUCTED ACCORDING TO DEFECTS LISTED IN THE 16 BIT MDBSF, THE 16 BIT UDBSF, AND THE 16 BIT SSF.

1. THE SSF IS CHECKED FOR AN ENTRY ON THE CURRENT TRACK. IF AN ENTRY EXISTS, THE SSE BIT IS SET IN THE HEADER OF THE SECTOR LISTED AND IN ALL FOLLOWING SECTORS, TO THE END OF THE CURRENT TRACK. (SEE SECTION 9.2)

2. THE DEC STD 144 FILE IS CHECKED FOR ANY ENTRIES ON THE CURRENT TRACK.

   FOR DEC STD 144 ENTRIES WHICH OCCUR BEFORE A SKIPPED SECTOR OR ON A TRACK WHICH DOES NOT HAVE A SKIPPED SECTOR, THE APPROPRIATE HEADER BIT IS RESET (MF OR UF, ACCORDING TO THE FILE CONTAINING THE DEFECT ADDRESS). ALSO, THE ACTUAL ADDRESS (PHYSICAL ADDRESS) OF THE DEFECT IS LISTED IN THE DEC STD 144 FILE. (SEE SECTION 9.1 AND 9.3)

   FOR DEC STD 144 ENTRIES WHICH OCCUR AFTER A SKIPPED SECTOR, THE APPROPRIATE HEADER BIT .S RESET (MF OR UF, ACCORDING TO THE FILE CONTAINING THE DEFECT ADDRESS). ALSO, THE DEFECT IS LISTED IN THE DEC STD 144 FILE BY LOGICAL ADDRESS. (SEE SECTION 9.4 - 9.11) THE LOGICAL ADDRESS IS:

   LOGICAL ADDRESS = PHYSICAL(CYL,TRK,SEC-1)

7.2 NEW DEFECTS

NEWLY DETECTED ERRORS ON TRACKS WHICH ALREADY HAVE ERRORS, ARE HANDLED AS FOLLOWS:

1. IF THE ERROR OCCURS BEFORE A SKIPPED SECTOR OR IF THERE IS NO SSF ENTRY FOR THE CURRENT TRACK, THE PHYSICAL ADDRESS OF THE SECTOR IS ENTERED IN THE 16 BIT UDBSF AND THE UF BIT IN THE HEADER OF EACH ERRORED SECTOR IS RESET. (SEE SECTION 9.1 AND 9.3)

2. IF THE ERROR OCCURS AFTER A SKIPPED SECTOR, THE LOGICAL ADDRESS OF THE SECTOR IS ENTERED IN THE 16 BIT UDBSF AND THE UF BIT IN THE HEADER OF EACH ERRORED SECTOR IS RESET. (SEE SECTION 9.4 - 9.10) THE LOGICAL ADDRESS IS:

   LOGICAL ADDRESS = PHYSICAL(CYL,TRK,SEC-1)

   ADDITIONALLY, IF THE DEFECT SECTOR HAS A HEADER RELATED ERROR, THE SECTOR'S PHYSICAL ADDRESS IS ALSO ENTERED IN THE 16 BIT UDBSF. (SEE SECTION 9.5) HOWEVER, IF THE HEADER ERROR

IS SECTOR 31, ONLY THE SECTOR'S LOGICAL ADDRESS IS ENTERED IN THE UDBSF. (SEE SECTION 9.10)

FOR THE CASE OF A SECTOR WITH A HEADER FIELD DEFECT WHICH IS IMMEDIATELY FOLLOWED BY A SECTOR WITH A DATA FIELD DEFECT, THE LOGICAL ADDRESSES WILL BE ENTERED IN THE 16 BIT UDBSF FOR EACH SECTOR. (SEE SECTION 9.9)

NEWLY DETECTED ERRORS ON TRACKS WHICH WERE PREVIOUSLY HAD NO ERRORS, ARE HANDLED AS FOLLOWS:

1. SKIPPED SECTORING STARTS WITH THE FIRST (PRIMARY), NON-HEADER DEFECT ON THE TRACK. THE PHYSICAL ADDRESS OF THIS DEFECT IS ENTERED INTO THE SSF. (SEE SECTION 9.2)

   NOTE: SKIPPED SECTORING CANNOT BEGIN WITH A SECTOR WHICH HAS A HEADER FIELD DEFECT.

   THE HEADER OF THE SKIPPED SECTOR AND THE HEADERS OF THE SECTORS ON THE SAME TRACK FOLLOWING THE SKIPPED SECTOR WILL HAVE SSE (BIT 13) SET.

   THE UF BIT WILL BE RESET IN THE HEADER OF ALL NON-SKIPPED SECTORS EVEN THOUGH THE HEADER OF THE ERROR SECTOR MAY NOT BE READABLE.

2. HEADER FIELD AND DATA FIELD DEFECTS PRECEDING A SKIPPED SECTOR WILL BE ENTERED IN THE 16 BIT MDBSF BY PHYSICAL ADDRESS. (SEE SECTION 9.3)

3. IF THE ONLY DEFECT ON A TRACK IS SECTOR 31, THE DEFECT WILL BE MARKED AS A SKIPPED SECTOR, EVEN IF THE DEFECT AFFECTS THE HEADER, AND ITS ADDRESS ENTERED IN THE SSF. (SEE SECTION 9.11)

4. MULTIPLE DEFECTS WITHIN A SECTOR WILL BE CONSIDERED A SINGLE DEFECT. IF BOTH THE HEADER AND THE DATA FIELD ARE AFFECTED BY DEFECTS, THE HEADER DEFECT WILL TAKE REPORTING PRECEDENCE.

5. NEW DEFECTS DETECTED ON PREVIOUSLY ERROR FREE TRACKS WITHIN THE DEC STD 144 AREA, THE SSF TRACK, OR THE FE TRACKS ARE NOT ENTERED IN THE 16 BIT UDBSF. IF APPROPRIATE, A DEFECT ON ANY OF THESE TRACKS IS SKIPPED AND ITS ADDRESS IS ENTERED IN THE 16 BIT SSF. IF A DEFECT WITHIN THIS ADDRESSING RANGE CANNOT BE SKIPPED, THE DEFECT WILL BE TREATED AS A DEC STD 144 ERROR (I.E., THE UF BIT IS RESET IN THE HEADER) EXCEPT THAT THE ADDRESS OF THE DEFECT IS NOT ENTERED IN THE 16 BIT UDBSF.

8.0 BAD SECTOR FILE LAYOUTS

8.1 SKIPPED SECTOR FILE (SSF)

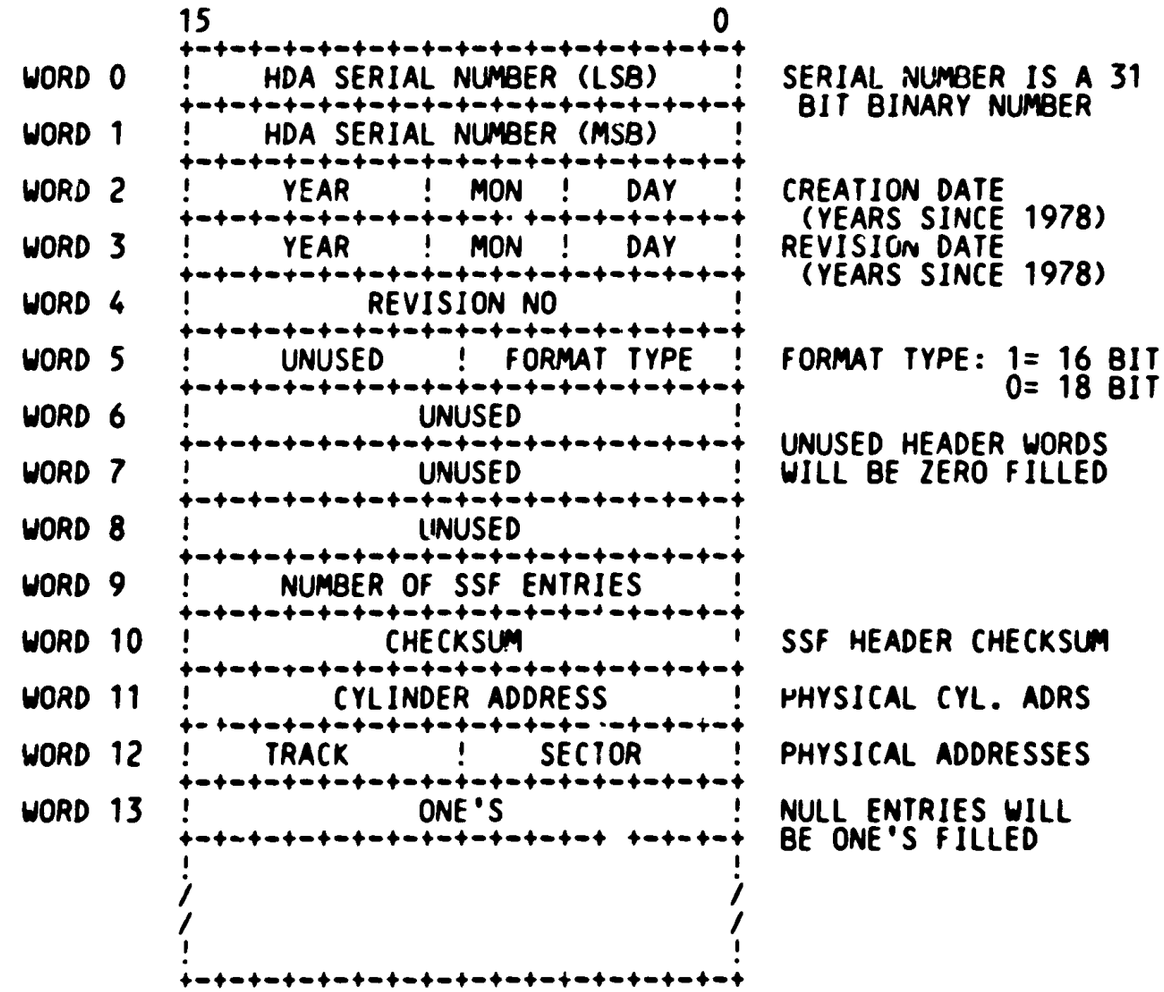
THE SSF HAS STORAGE SPACE FOR THE PHYSICAL ADDRESSES OF 378 SKIPPED SECTORS. DEFECT ADDRESSES ARE STORED IN THE SSF IN ASCENDING SEQUENCE IN THE SAME FORMAT AS IN THE DEC STD 144 FILES, I.E.,

CYLINDER ADDRESS FOLLOWED BY SECTOR AND TRACK ADDRRESSES. THE SSF WILL BE FILLED WITH ONE'S BETWEEN THE LAST DEFECT ADDRESS AND THE CHECKSUM. NOTE THAT BOTH THE HEADER PORTION AND THE DATA PORTION OF THE SSF ARE PROTECTED BY CHECKSUMS. THE 16 BIT SSF IS REPEATED 5 TIMES ON THE FIRST TRACK OF THE FE AREA: CYLINDER 559, TRACK 0. THE SSF TRACK IS WRITTEN IN 16 BIT MODE.

THE SERIAL NUMBER FIELD IN BOTH THE SSF AND THE DEC STD 144 FILE IS IN THE SAME FORMAT.

THE SSF FILE FOR 18 BIT MODE DEFECTS WILL BE REPEATED 5 TIMES FOLLOWING THE 16 BIT SSF FILE. SINCE SKIPPED SECTORING IS A MECHANISM WHICH IS INHIBITED WHEN THE RM80 IS BEING OPERATED IN 18 BIT MODE, THE USE OF THE SSF FOR 18 BIT MODE ADDRESSES IS ONLY TO PASS THE 18 BIT MODE ADDRESSES OF HDA DEFECTS WHICH DO NOT APPEAR IN THE DEC STD 144 FILE. THE 18 BIT SSF COPIES WILL NEITHER BE USED NOR PRESERVED DURING 16 BIT FIELD FORMATTING.

THE SSF FILE LAYOUT FOR BOTH 16 BIT MODE AND 18 BIT MODE FILES ARE AS FOLLOWS:



```
                                  WORD 766 :              ONE'S              !
                                           +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
                                  WORD 767 !            CHECKSUM             !  DEFECT ADDRESS FIELD
                                           +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+   CHECKSUM
```

THE CHECKSUM IS CALCULATED USING THE FOLLOWING ALGORITHM. THE CHECKSUM CALCULATION IS BASED ON 16 BIT QUANTITIES (WORDS) AND IS REPEATED ONCE FOR THE SSF HEADER FIELD AND ONCE FOR THE SSF DATA FIELD.

```
SIZE = FIELD_SIZE_IN_16_BIT_WORDS
CHECKSUM = 1
REPEAT
   CHECKSUM = CHECKSUM + (16_BIT_WORD)
   CHECKSUM = CHECKSUM .ROTATED_LEFT_1_BIT.
   SIZE = SIZE - 1
UNTIL SIZE .EQ. 0
END_REPEAT
```

THE ROTATE REFERED TO ABOVE IS THE FOLLOWING:

```
   +---------------------------------------+
   ^                                       :
   !                                       V
   +-+      +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   !*! <--- !15!                           !0!
   +-+      +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

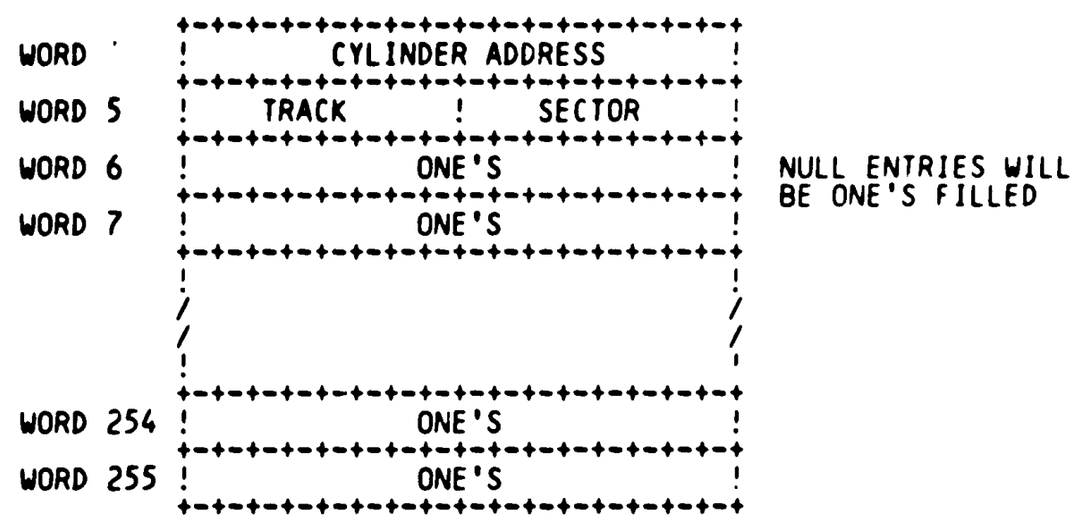
'*' REFERS TO EITHER THE 'C' BIT FOR PDP-11 OPERATION OR BIT 16 FOR MACHINES OTHER THAN THE PDP-11. NOTE THAT THE ROTATE OCCURS AFTER THE ADDITION; THE BIT SHIFTED INTO THE LSB POSITION OF THE ACCUMULATED CHECKSUM IS THE 'CARRY OUT' FROM THE 16 BIT ADDITION OPERATION.

8.2 DEC STD 144 MANUFACTURING AND USER BAD SECTOR FILES

THE DEC STD 144 FILE IS CONTAINED ON TWO TRACKS ON THE RM80. THE FIRST TRACK IS THE PRIMARY COPY OF THE FILE, THE SECOND TRACK IS THE SECONDARY COPY OF THE FILE. THE PRIMARY COPY OF THE DEC STD 144 FILE IS WRITTEN ON THE LAST ADDRESSABLE TRACK BEFORE THE FE CYLINDERS (CYL 558, TRK 13); THE SECONDARY COPY OF THE DEC STD 144 FILE IS WRITTEN AT CYL 559, TRK 1.

BOTH THE PRIMARY AND THE SECONDARY DEC STD 144 TRACKS ARE WRITTEN IN 16 BIT MODE. THE LAYOUT OF THE DEC STD 144 RECORD IS GIVEN BELOW. THE LAYOUT IS THE SAME FOR ALL COPIES OF HE FILE.

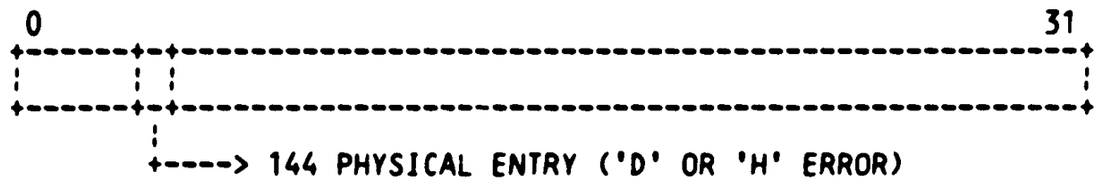
```
            15                                  0
            +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
WORD 0      !    HDA SERIAL NUMBER (LSB)     !  SERIAL NUMBER IS A 31
            +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+   BIT BINARY NUMBER
WORD 1      !    HDA SERIAL NUMBER (MSB)     !
            +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
WORD 2      !              ZERO              !
            +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
WORD 3      !              ZERO              !
```



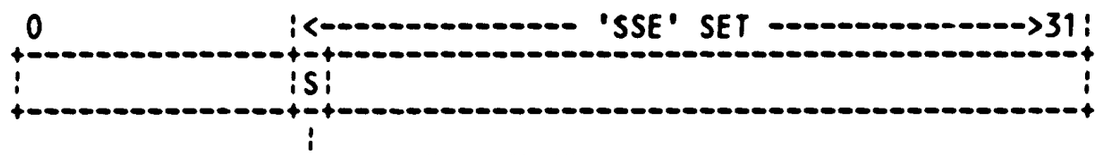
THE 16 BIT MDBSF WILL BE WRITTEN IN SECTORS 0, 2, 4, 6, 8 OF THE PRIMARY AND SECONDARY DEC STD 144 TRACKS; THE 18 BIT MDBSF IS BE WRITTEN IN SECTORS 1,3,5,7,9. THE 16 BIT UDBSF IS WRITTEN IN SECTORS 10,12,14....30; THE 18 BIT UDBSF IS WRITTEN IN SECTORS 11,13,15....29.

9.0 ERROR TYPE DESCRIPTIONS

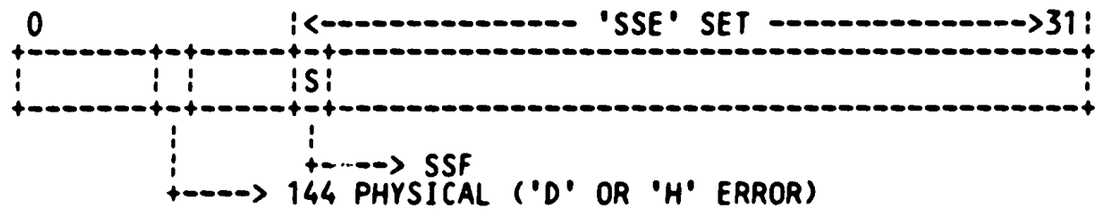
1.



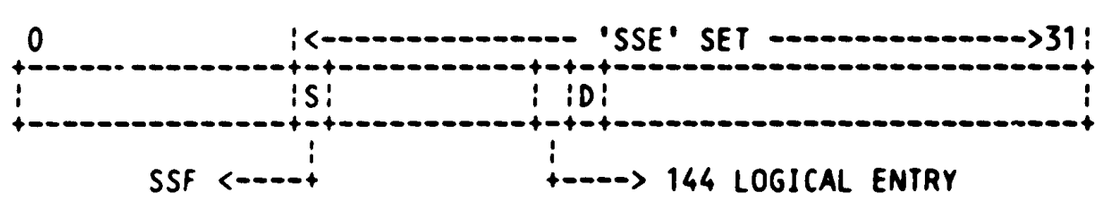
2.



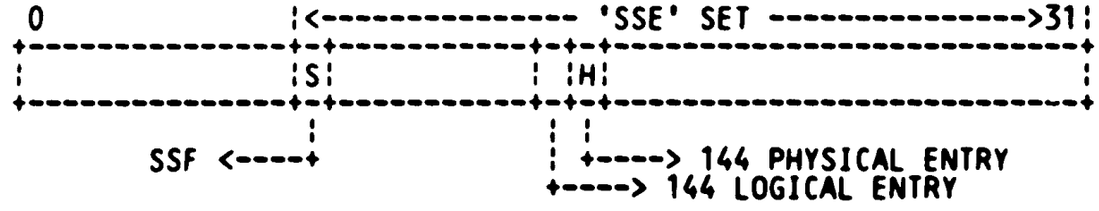
3.



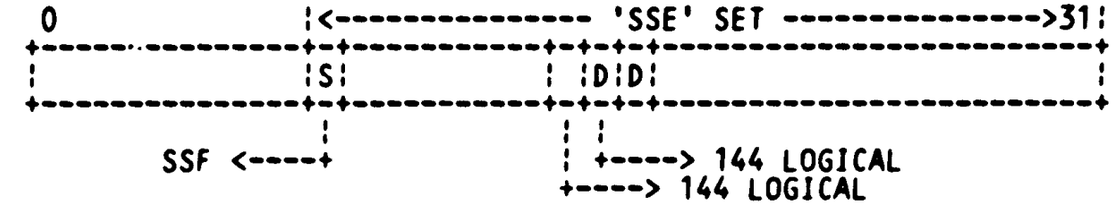
4.



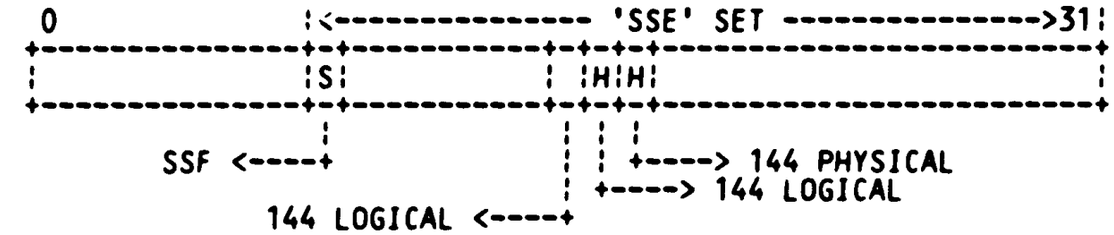
5.



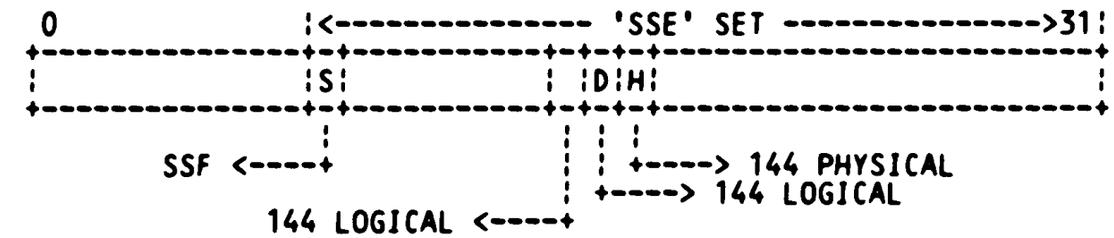
6.


0
'SSE' SET
31
S
D
D
SSF
144 LOGICAL
144 LOGICAL

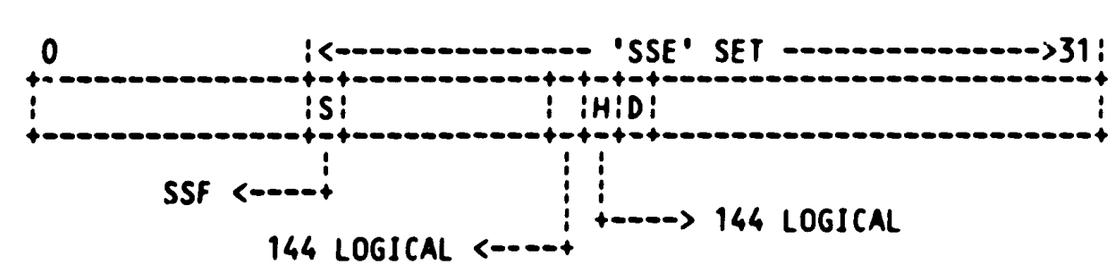
7.


0
'SSE' SET
31
S
H
H
SSF
144 PHYSICAL
144 LOGICAL
144 LOGICAL

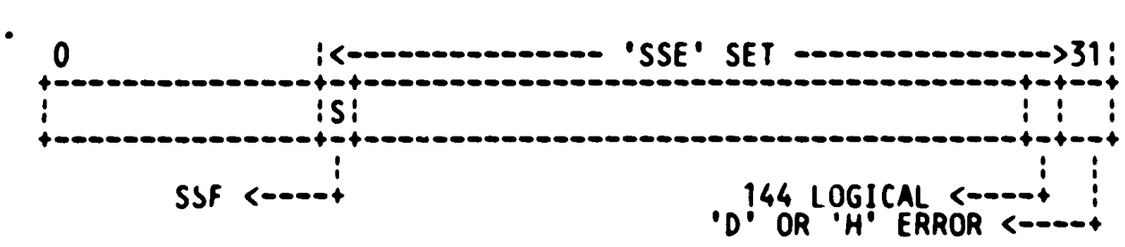
8.


0
'SSE' SET
31
S
D
H
SSF
144 PHYSICAL
144 LOGICAL
144 LOGICAL

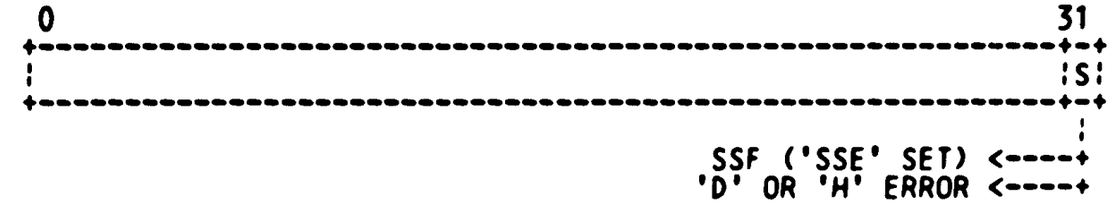
9.


0
'SSE' SET
31
S
H
D
SSF
144 LOGICAL
144 LOGICAL

10.


0
'SSE' SET
31
S
SSF
144 LOGICAL
'D' OR 'H' ERROR

11.



NOTE: 'D' IS A DATA FIELD DEFECT; 'H' IS A HEADER FIELD DEFECT;
'S' IS A SKIPPED SECTOR DEFECT

```
SYMBOL TABLE

. ABS.  000000     000
        000000     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  19 WORDS  ( 1 PAGES)
DYNAMIC MEMORY:  8206 WORDS  ( 31 PAGES)
ELAPSED TIME:  00:00:26
,[300,30]CZRNJA=[300,10]BEG.DOC,CZRNJA.DOC,END.DOC
```

CZRNJA.TSK;1 MEMORY ALLOCATION MAP TKB PAGE 1 SEQ 0020
12-JAN-82 11:06

```
TASK    NAME    : CZRNJA
PARTITION NAME  : GEN
IDENTIFICATION  : 01.00
TASK  UIC       : [300,10]
TASK  PRIORITY  : 65.
STACK    LIMITS: 026172 026501 000310 00200.
PRG XFR ADDRESS: 026502
TOTAL ADDRESS WINDOWS: 1.
TASK  IMAGE  SIZE  : 14464. WORDS
TASK ADDRESS LIMITS: 026000 116303
R-W DISK BLK LIMITS: 000002 000072 000071 00057.

*** ROOT SEGMENT: FMTROT

R/W MEM  LIMITS: 026000 116303 070304 28868.
DISK BLK LIMITS: 000002 000072 000071 00057.

MEMORY ALLOCATION SYNOPSIS:

SECTION                                          TITLE  IDENT  FILE
-------                                          -----  -----  ----
. BLK.:(RW,I,LCL,REL,CON) 026502 020500 08512.
                          026502 000276 00190. FMTROT 01.00  FMTROT.OBJ;1
                          027000 000444 00292. FMTIO  01.00  FMTIO.OBJ;1
                          027444 000152 00106. FMTDAT 01.00  FMTDAT.OBJ;1
                          027616 001666 00950. FMTMSG 01.00  FMTMSG.OBJ;1
                          031504 003040 01568. FMTSUB 01.00  FMTSUB.OBJ;1
                          034544 001026 00534. FMTPRS 01.00  FMTPRS.OBJ;1
                          035572 001104 00580. FMTR80 01.00  FMTR80.OBJ;1
                          036676 001252 00682. FMTR8F 01.00  FMTR8F.OBJ;1
                          040150 001524 00852. FMTR8V 01.00  FMTR8V.OBJ;1
                          041674 001316 00718. FMTR8M 01.00  FMTR8M.OBJ;1
                          043212 001270 00696. FMTR8L 01.00  FMTR8L.OBJ;1
                          044502 000370 00248. FMTINT 01.00  FMTINT.OBJ;1
IMPURE:(RW,D,LCL,REL,CON) 047202 000016 00014.
$KSTR :(RW,D,LCL,REL,CON) 047220 000031 00025.
                          047220 000031 00025. FMTPRS 01.00  FMTPRS.OBJ;1
$KTAB :(RW,D,LCL,REL,CON) 047252 000016 00014.
                          047252 000016 00014. FMTPRS 01.00  FMTPRS.OBJ;1
$STATE:(RW,D,LCL,REL,CON) 047270 000166 00118.
                          047270 000166 00118. FMTPRS 01.00  FMTPRS.OBJ;1
$$RESL:(RW,I,LCL,REL,CON) 047456 000246 00166.
$$$$BF:(RW,D,LCL,REL,CON) 047724 046356 19694.
                          047724 046356 19694. FMTDAT 01.00  FMTDAT.OBJ;1


GLOBAL SYMBOLS:

BASYR  000116    IE.BLK 177754   IE.OFL 177677   IO.DET 002000   IO.HMS 004000   IO.RLB 001000   IO.RTD 004120
DPARS  035746-R  IE.DAA 177770   IE.PRI 177760   IO.DGN 004150   IO.LPC 004100   IO.RNF 004060   IO.RVB 010400
DSKLUN 000003    IE.DNR 177775   IO.ATT 001400   IO.FER 004200   IO.OFF 004020   IO.RNR 004070   IO.TDD 004140
GENHDR 034400-R  IE.EOF 177766   IO.BLS 004010   IO.FEW 004210   IO.RDH 004030   IO.RPD 004170   IO.WCH 004110
```

```
IO.WCK 004050    $DSKWC 027000-R  $MGPRE 037644-R  $MSG32 030714-R  $MXTRK 027566-R  $SRALL 033654-R  $STVFL 035454-R
IO.WDH 004040    $DSKWH 027014-R  $MOVE  031744-R  $MSG4  027662-R  $NONSI 002416    $SRFES 033726-R  $SWERL 047735-R
IO.WPD 004160    $DSTRB 042206-R  $MSGR8 031366-R  $MSG40 030742-R  $PARSE 034544-R  $SRMDF 033740-R  $SWFFE 047741-R
IO.WTD 004130    $DVICE 027446-R  $MSGWR 031414-R  $MSG41 031000-R  $PAT   027462-R  $SRSDF 033764-R  $SWFMT 047740-R
IQ.UMD 000004    $DVPRM 027560-R  $MSG1  027634-R  $MSG42 031026-R  $PHYDV 027606-R  $SRSSF 034046-R  $SWINT 047742-R
MSGER8 042041-R  $DVUNT 047754-R  $MSG10 030122-R  $MSG43 031056-R  $PRINT 027256-R  $SRTMF 034166-R  $SWLOG 047737-R
OPTKT2 047252-R  $EROCT 031600-R  $MSG11 030143-R  $MSG44 031103-R  $PRMPT 031754-R  $SRTRK 033612-R  $SWLST 047736-R
OPTST2 047300-R  $EROUT 031536-R  $MSG12 030167-R  $MSG45 031141-R  $PRNTO 027262-R  $SRTSF 034132-R  $SWMOD 047743-R
SECSZ  027472-R  $FEBSF 116102-R  $MSG13 030177-R  $MSG5  027707-R  $RDBSF 032322-R  $SRTUF 034222-R  $SYSIZ 003456
SKPFRE 047744-R  $FLCYL 047764-R  $MSG15 030225-R  $MSG58 031166-R  $RDSSF 033156-R  $SRUDF 033752-R  $TRK   047774-R
SPEFN  000003    $FLRGS 040036-R  $MSG16 030237-R  $MSG59 031233-R  $READ  027342-R  $SSF   113102-R  $TSTDA 032160-R
TRKSZ  027470-R  $FLSEC 047770-R  $MSG17 030246-R  $MSG6  027737-R  $RETRY 027466-R  $SSFDT 001365    $TSTDV 035062-R
UNTKT1 047252-R  $FLTRK 047766-R  $MSG18 030256-R  $MSG6A 027762-R  $REVNM 047732-R  $SSFHD 000013    $TSTMX 032216-R
UNTST1 047270-R  $FMTEP 026502-R  $MSG19 030301-R  $MSG6B 030004-R  $RGBUF 050000-R  $SSFLB 027454-R  $UBSSZ 027574-R
$ALFLB 027450-R  $FMTEX 031464-R  $MSG2  027645-R  $MSG7  030025-R  $RM80  035754-R  $SSFLN 000003    $UCB   047724-R
$BUF   050062-R  $FUNC  027476-R  $MSG20 030324-R  $MSG70 031274-R  $RM80F 037234-R  $SSFSZ 027460-R  $UDBSF 112102-R
$BUFRX 110262-R  $HDRFG 047762-R  $MSG21 030351-R  $MSG71 031307-R  $RM80I 044570-R  $STARS 027620-R  $UNTID 032266-R
$BUFX  110262-R  $HOMSK 031710-R  $MSG22 030403-R  $MSG72 031322-R  $RM80L 043574-R  $STATS 027444-R  $UPDMX 032120-R
$CONPB 027524-R  $INADD 047730-R  $MSG23 030427-R  $MSG73 031344-R  $RM80M 042124-R  $STCSR 035230-R  $VERIF 047745-R
$CR    027616-R  $IOBUF 027510-R  $MSG24 030474-R  $MSG8  030043-R  $RM80V 040366-R  $STERL 035506-R  $WLKER 027250-R
$CVTDA 031636-R  $IOST  027554-R  $MSG25 030502-R  $MSG8A 030070-R  $RTCNT 047752-R  $STFFE 035552-R  $WTBSF 032730-R
$CYL   047772-R  $LBNH  027516-R  $MSG26 030510-R  $MSG9  030076-R  $R80SF 037164-R  $STFOR 035556-R  $WTSSF 033464-R
$DEVHD 003334    $LBNL  027520-R  $MSG27 030540-R  $MULT  032046-R  $R80TF 037226-R  $STIN  035564-R  $XFRSZ 027512-R
$DSKIO 027020-R  $LOGDV 027576-R  $MSG28 030574-R  $MVPAT 031504-R  $SCB   047726-R  $STLIS 035544-R  $YESNO 047734-R
$DSKPB 027474-R  $MBSSZ 027572-R  $MSG29 030626-R  $MXCYL 027564-R  $SEC   047776-R  $STLOG 035540-R
$DSKRH 027006-R  $MDBSF 111102-R  $MSG30 030650-R  $MXLBN 047756-R  $SMBS- 033774-R  $STUNT 034744-R
$DSKRT 027030-R  $MESAG 031422-R  $MSG31 030671-R  $MXSEC 027570-R  $SNAME 047746-R  $STVEC 035344-R
```

```
TOTAL WORK FILE REFERENCES: 46347.
WORK  FILE  READS: 0.
WORK  FILE WRITES: 0.
SIZE OF CORE POOL: 8200. WORDS (32. PAGES)
SIZE OF WORK FILE: 3328. WORDS (13. PAGES)

ELAPSED TIME:00:00:38
```

```
                        .TITLE  FMTROT - RM80 FORMATTER ROOT MODULE
                        .IDENT  /01.00/
                        ;
                        ;
                        ; COPYRIGHT (C) 1980
                        ; DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS.
                        ;
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                        ;
                        ;
                        ; VERSION 01.00
                        ;
                        ; C. HESS       17-AUG-80
                        ; M. LEAVITT    09-JAN-81
                        ;
                        ;
                        .MCALL  ALUN$S,UCBDF$
                        ;
000000                          UCBDF$                  ;CALL MACRO TO DEFINE UCB OFFSETS
                        ;
```

```
                                ;+
                                ; **-$FMTEP-FORMATTER ENTRY POINT
                                ;
                                ; THIS ROUTINE WILL CALL THE PARSER, SETUP THE DISK PARAMETERS, CALL THE
                                ; ACTUAL FORMATTING ROUTINE, & CLEAN UP AFTER THE FORMAT OPERATION.
                                ;-
                                
000000  105067  000000G       $FMTEP::CLRB    $SWERL          ; RESET ERROR LIMIT (DEFAULT IS 256.)
000004  105067  000000G               CLRB    $YESNO          ; RESET YES/NO RESPONSE
000010  105067  000000G               CLRB    $SWLST          ; RESET BAD BLOCK FILE LIST SWITCH
000014  105067  000000G               CLRB    $SWLOG          ; RESET LOGICAL LIST SWITCH
000020  105067  000000G               CLRB    $SWFMT          ; RESET FORMAT ENABLE SWITCH
000024  105067  000000G               CLRB    $SWFFE          ; RESET FORMAT FE ENABLE SWITCH
000030  105067  000000G               CLRB    $SWINT          ; RESET MDBSF, UDBSF, SSF GENERATION SWITCH
000034  105067  000000G               CLRB    $SWMOD          ; RESET THE MDBSF, SSF, & FEBSF MODIFY SWITCH
000040  105067  000001G               CLRB    $STATS+1        ; CLEAR STATUS FLAGS
000044  005067  000000G               CLR     $REVNM          ; CLEAR TEMPORARY STORAGE FOR REVISION NUMBER
000050  112767  000001  000000G       MOVB    #1,$VERIF       ; PRESET THE VERIFICATION COUNT
000056  012703  000400               MOV     #256.,R3        ; LOCATIONS IN THE MDBSF BUFFER TO CLEAR
000062  012700  000000G               MOV     #$MDBSF,R0      ; BUFFER POINTER
000066  012720  177777        1$:    MOV     #-1,(R0)+       ; CLEAR A LOCATION
000072  005303                       DEC     R3              ; COUNT THE LOCATION
000074  001374                       BNE     1$              ; IF NE, NOT FINISHED
000076  012703  000400               MOV     #256.,R3        ; LOCATIONS TO CLEAR IN THE UDBSF BUFFER
000102  012700  000000G               MOV     #$UDBSF,R0      ; BUFFER POINTER
000106  012720  177777        2$:    MOV     #-1,(R0)+       ; CLEAR A LOCATION
000112  005303                       DEC     R3              ; COUNT THE LOCATION
000114  001374                       BNE     2$              ; IF NE, NOT FINISHED
000116  012703  000100               MOV     #64.,R3         ; LOCATIONS TO CLEAR IN THE FE BSF BUFFER
000122  012700  000000G               MOV     #$FEBSF,R0      ; BUFFER POINTER
000126  012720  177777        3$:    MOV     #-1,(R0)+       ; CLEAR A LOCATION
000132  005303                       DEC     R3              ; COUNT THE LOCATION
000134  001374                       BNE     3$              ; IF NE, NOT FINISHED
000136  012703  000000C               MOV     #256.*<$SSFLN>,R3       ; NUMBER OF SSF LOCATIONS
000142  012700  000000G               MOV     #$SSF,R0        ; BUFFER POINTER
000146  012720  177777        4$:    MOV     #-1,(R0)+       ; CLEAR A LOCATION
000152  005303                       DEC     R3              ; COUNT THE LOCATION
000154  001374                       BNE     4$              ; IF NE, NOT FINISHED
000156  012706  000000'               MOV     #$FMTEP,SP      ; RESET STACK POINTER
000162  026727  000000G 001400       CMP     $SYSIZ,#40*24.  ; IS THERE AT LEAST 24K?
000170  103001                       BHIS    5$              ; IF HIS, YES
000172                               CRASH                   ; ELSE CRASH THE SYSTEM!!

000174                        5$:    CALL    $PARSE          ; PROMPT AND PARSE COMMAND LINE
000200                               ALUN$S  #DSKLUN,$DVICE,R1       ; ASSIGN LUN TO DISK
000220  012700  000000G               MOV     #$MSG4,R0       ; ASSUME DEVICE NOT IN SYSTEM
000224  103002                       BCC     FMTPRM          ; IF CC, DEVICE IN SYSTEM
000226  000167  000000G        6$:    JMP     $MSGWR          ; EXIT WITH WARNING STATUS

                                ;
                                ; ATTACH THE DISK
                                ;

000232  012703  000000C       FMTPRM: MOV     #IO.ATT!IQ.UMD,R3       ; ATTACH DISK FOR FORMATTING
000236                               CALL    $DSKIO

                                ;
```

```
                                ; PRESET THE DISK PARAMETERS, RETURN THE HEADS HOME AND
                                ; CALL THE ACTUAL FORMAT ROUTINE.
                                ;

000242  005067  000000G               CLR     $SEC            ; RESET DISK PARAMETERS
000246  005067  000000G               CLR     $TRK
000252  005067  000000G               CLR     $CYL
000256                                CALL    $HOMSK          ; DO A RECALIBRATE
000262                                CALL    $RM80           ; CALL THE FORMATTER
000266                                CALL    $HOMSK          ; DO A RECAL
000272  000167  000000G               JMP     $FMTEX          ; EXIT GRACEFULLY

        000000'                 .END    $FMTEP
```

SYMBOL TABLE

```
C$$ORE= 002000          S$$YSZ= 001400          UC.ALG= 000200          U.CW3   000014          U2.NEC= 004000
C$$RSH= 177564          S1.BEL= 000400          UC.ATT= 000010          U.CW4   000016          U2.PRV= 000010
C$$TTY= 177564          S1.CTO= 000040          UC.KIL= 000004          U.DCB   000000          U2.RMT= 020000
DSKLUN= ****** GX       S1.CTS= 010000          UC.LGH= 000003          U.FCDE= 000040          U2.R04= 100000
DV.CCL= 000002          S1.DEC= 002000          UC.NPR= 000100          U.FNUM= 000036          U2.SCS= 000004
DV.COM= 020000          S1.DPR= 001000          UC.PWF= 000020          U.FPS = 000044          U2.SLV= 000200
DV.DIR= 000010          S1.DSI= 004000          UC.QUE= 000040          U.KCSR= 000032          U2.VT5= 000002
DV.F11= 040000          S1.ESC= 000004          US.ABO= 000001          U.KCS6= 000034          U2.7CH= 010000
DV.ISP= 002000          S1.IBF= 100000          US.BSP= 000002          U.LUIC  177774          V$$CTR= 000400
DV.MBC= 000400          S1.IBY= 000200          US.BSY= 000200          U.OWN   177776          V$$RSN= 000032
DV.MNT= 100000          S1.OBY= 000100          US.CRW= 000004          U.RED   000002          X$$DBT= 000000
DV.MXD= 000100          S1.RAL= 000010          US.DSB= 000010          U.RPS = 000042          $CYL  = ****** GX
DV.OSP= 004000          S1.RNE= 000020          US.ECH= 000002          U.SCB   000020          $DSKIO= ****** GX
DV.PSE= 010000          S1.RST= 000001          US.FOR= 000040          U.STS   000005          $DVICE= ****** GX
DV.RFC= 000001          S1.RUB= 000002          US.FRK= 000002          U.ST2   000007          $FEBSF= ****** GX
DV.SDI= 000020          S1.USI= 020000          US.KPF= 000001          U.TCHP  000042          $FMTEP  000000RG
DV.SQD= 000040          S2.ACR= 000001          US.LAB= 000004          U.TCVP  000043          $FMTEX= ****** GX
DV.SWL= 001000          S2.BRQ= 000020          US.MDE= 000002          U.TFLK  000040          $HOMSK= ****** GX
DV.TTY= 000004          S2.CR = 000010          US.MDM  000020          U.TFRQ  000037          $MDBSF= ****** GX
DV.UMD= 000200          S2.FDX= 100000          US.MNT= 000100          U.TLPP  000036          $MSGWR= ****** GX
D$$IAG= 000000          S2.FLF= 040000          US.OFL= 000001          U.TMTI  000047          $MSG4 = ****** GX
D$$L11= 000001          S2.HFF= 020000          US.OUT= 000001          U.TSTA  000026          $PARSE= ****** GX
FMTPRM  000232R         S2.HFL= 003400          US.PUB= 000004          U.TTAB  000034          $REVNM= ****** GX
H$$RTZ= 000074          S2.HHT= 010000          US.PWF= 000010          U.TTYP  000046          $RM80 = ****** GX
IO.ATT= ****** GX       S2.IRQ= 000200          US.RED= 000002          U.TUX   000024          $SEC  = ****** GX
IQ.UMD= ****** GX       S2.ORQ= 000100          US.SHR= 000001          U.UIC   000044          $SSF  = ****** GX
K$$CNT= 177546          S2.SRQ= 000040          US.SPU= 000002          U.UNIT  000006          $SSFLN= ****** GX
K$$CSR= 177546          S2.VFL= 004000          US.UMD= 000010          U.VCB = 000034          $STATS= ****** GX
K$$IEN= 000115          S2.WRA= 000006          US.VV = 000001          U2.AT.= 000020          $SWERL= ****** GX
K$$LDC= 000001          S2.WRB= 000007          US.WCK= 000010          U2.CRT= 002000          $SWFFE= ****** GX
K$$TPS= 000074          S3.BCC= 020000          U.ACP = 000032          U2.DH1= 100000          $SWFMT= ****** GX
LD$TT = 000C00          S3.DAD= 040000          U.ATT   000022          U2.DJ1= 040000          $SWINT= ****** GX
L$$DRV= 000000          S3.PCU= 100000          U.BUF   000024          U2.DZ1= 000100          $SWLOG= ****** GX
M$$CRB= 000124          S3.RAL= 000010          U.CBF = 000032          U2.ESC= 001000          $SWLST= ****** GX
N$$LDV= 000001          S3.RCU= 000400          U.CLI   177772          U2.HFF= 010000          $SWMOD= ****** GX
P$$NIC= 177564          S3.TAB= 000100          U.CNT   000030          U2.HLD= 000040          $SYSIZ= ****** GX
R$$DER= 000000          S3.VER= 010000          U.CTL   000004          U2.LOG= 000400          $TPK  = ****** GX
R$$M11= 000001          S3.WAL= 004000          U.CTYP  000050          U2.LWC= 000001          $UDBSF= ****** GX
R$$11M= 000000          S3.WES= 000040          U.CW1   000010          U2.L3S= 000004          $VERIF= ****** GX
R$$11S= 000000          S3.8BC= 000200          U.CW2   000012          U2.L8S= 010000          $YESNO= ****** GX
S$$WRG= 000000          T$$MIN= 000000

. ABS.  177776     000
        000276     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  3572 WORDS  ( 14 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:18
[300,20]FMTROT,[300,30]FMTROT=[1,1]EXEMC/ML,[1,60]RSXMC/PA:1,[300,10]FMTROT
```

```
                        .TITLE  FMTIO - I/O ROUTINES
                        .IDENT  /01.00/
                        ;
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                        ;
                        ; C. HESS       14-AUG-80
                        ; M. LEAVITT    15-OCT-80
                        ;
                        ;
                        .MCALL  DIRS$
```

```
                        ;+
                        ; **-$DSKIO-ISSUE QIO TO DISK
                        ; **-$DSKRH-ISSUE QIO TO READ HEADER & DATA
                        ; **-$DSKRT-RETRY QIO TO DISK
                        ; **-$DSKWH-ISSUE QIO TO WRITE HEADER & DATA
                        ; **-$DSKWC-ISSUE QIO TO WRITE CHECK HEADER & DATA
                        ;
                        ; SUBROUTINES TO ISSUE I/O FUNCTIONS TO A DEVICE.
                        ;
                        ; INPUTS:
                        ;       R3 = I/O FUNCTION CODE (IF ENTRY IS AT $DSKIO)
                        ;       R5 = BUFFER ADDRESS
                        ;       ENTRY AT $DSKRT ASSUMES THAT THE DPB IS ALREADY SETUP.
                        ;
                        ; OUTPUTS:
                        ;       THE QIO DIRECTIVE IS ISSUED.  IF THERE WERE NO ERRORS, THE
                        ;       CARRY BIT WILL BE CLEARED.  IF THERE WAS A PARITY ERROR
                        ;       (IE.VER) OR A BAD BLOCK ERROR (IE.BBE) CARRY WILL BE SET.
                        ;       IF WE ARE FORMATTING A "DB" DISK A BLOCK NUMBER VIOLATION
                        ;       (IE.BLK) MAY HAPPEN WHEN WE ARE FORMATTING THE LAST SECTOR.
                        ;       FOR THIS CASE CARRY WILL BE RETURNED CLEAR.  THE SAME APPLIES
                        ;       IF WE ARE RE-WRITING THE LAST TRACK OF "DM" AND "DR" DISKS.
                        ;       ALSO SPECIFIC ERROR MESSAGES WILL BE PRINTED WHEN THE
                        ;       FOLLOWING ERRORS ARE DETECTED:
                        ;
                        ;               1. IE.HWR
                        ;               2. IE.DNR
                        ;               3. IE.DAA
                        ;               4. IE.FHE
                        ;               5. IE.PRI
                        ;               6. IE.OFL
                        ;
                        ;       ANY OTHER ERROR CODE WILL  BE REPORTED AS "UNRECOVERABLE".
                        ;
                        ; NOTE. MOST FUNCTIONS ARE ISSUED WITH THE DIAGNOSTIC SUB-FUNCTION
                        ;       BIT (IQ.UMD) SET.  FOR THESE FUNCTIONS THE FUNCTION WILL
                        ;       ALWAYS RETURN SUCCESS (CARRY CLEAR) AND THE USER MUST TEST
                        ;       THE PROPER BIT IN THE REGISTER BUFFER ($RGBUF) TO DETERMINE
                        ;       IF THERE WAS ANY ERRORS.
                        ;-
                        .ENABL  LSB
000000  012703  000000C  $DSKWC::MOV     #IO.WCH!IQ.UMD,R3       ; WRITE CHECK HEADER & DATA
000004  000405            $DSKIO          ; GO TO THE COMMON QIO ROUTINE
                        ;
000006  012703  000000C  $DSKRH::MOV     #IO.RDH!IQ.UMD,R3       ;READ DISK HEADER(S)
000012  000402            $DSKIO          ;BR INTO COMMOM DISK ROUTINE
                        ;
000014  012703  000000C  $DSKWH::MOV     #IO.WDH!IQ.UMD,R3       ;WRITE DISK HEADER(S)
000020  010367  000000G  $DSKIO::MOV     R3,$FUNC        ;STORE FUNCTION CODE IN DPB
000024  010567  000000G            MOV     R5,$IOBUF       ;STORE BUFFER ADDRESS IN DPB
000030                   $DSKRT::DIR$    #$DSKPB         ;ISSUE THE QIOW$
000036  103010                   BCC     1$              ;IF CC OK
000040  022767  000000G 000000G          CMP     #IE.UPN,$DSW    ;POOL SPACE AVAILABLE?
000046  001770                   BEQ     $DSKRT          ;IF EQ NO, TRY AGAIN
000050  016767  000000G 000000G          MOV     $DSW,$IOST      ;COPY DSW INTO STATUS BLOCK
000056  000406                   BR      2$
```

```
 90 000060  000241                  1$:     CLC                     ;ASSUME NO ERROR
 91 000062  105767  000000G                 TSTB    $IOST           ;ERROR?
 92 000066  100016                          BPL     6$              ;IF PL NO
 93 000070  105067  000001G                 CLRB    $IOST+1         ;YES, CLEAR THE HIGH BYTE
 94 000074  012700  000204'          2$:     MOV     #9$,R0          ;SET POINTER TO ERROR TABLE
 95 000100  021067  000000G          3$:     CMP     (R0),$IOST      ;SCAN ERROR TABLE TO FIND ERROR TYPE
 96 000104  001403                          BEQ     4$              ;IF EQ MATCH
 97 000106  022020                          CMP     (R0)+,(R0)+     ;STEP TO NEXT ENTRY
 98 000110  005710                          TST     (R0)            ;END OF TABLE?
 99 000112  001372                          BNE     3$              ;IF NE NO
100 000114  016000  000002          4$:     MOV     2(R0),R0        ;GET ADRS OF ERROR MESSAGE
101 000120  001002                          BNE     7$              ;IF NE PRINT MESSAGE
102 000122  000261                  5$:     SEC                     ;ELSE JUST SET CARRY AND EXIT
103 000124  000207                  6$:     RETURN
104
105 000126  020027  000000G          7$:     CMP     R0,#$MSG8       ;"UNRECOVERABLE" MESSAGE?
106 000132  001022                          BNE     8$              ;IF NE NO
107 000134  022767  000000C 000000G         CMP     #IE.BLK&377,$IOST       ;YES, IS THIS A BLOCK # VIOLATION?
108 000142  001767                          BEQ     5$              ;IF EQ YES
109 000144  012700  000000G                 MOV     #$MSG8A,R0      ;GET BUFFER ADDRESS FOR ERROR CODE
110 000150  005467  000000G                 NEG     $IOST           ;MAKE ERROR CODE POSITIVE
111 000154  116701  000000G                 MOVB    $IOST,R1        ;GET ERROR CODE
112 000160  005002                          CLR     R2              ;SUPRESS LEADING 0'S
113 000162  004767  000000G                 CALL    $CBDMG          ;CONVERT TO DECIMAL
114 000166  112720  000056                  MOVB    #'.,(R0)+       ;STUFF DECIMAL INDICATOR
115 000172  105010                          CLRB    (R0)            ;TERMINATE STRING
116 000174  012700  000000G                 MOV     #$MSG8,R0       ;GET ADDRESS OF 'UNRECOVERABLE" MESSAGE
117 000200  000167  000000G          8$:     JMP     $MESAG          ;PRINT MESSAGE AND EXIT
118
119                                         ;+
120                                         ; ERROR CODE AND ERROR MESSAGE TABLE.  A ZERO WORD
121                                         ; IN THE MESSAGE FIELD INDICATES THAT THE ERROR WILL
122                                         ; BE HANDLED BY THE CALLING ROUTINE.
123                                         ;-
124
125 000204  000000G 000000G          9$:         .WORD   IE.HWR,         $MSG13  ; HANDLER NOT RESIDENT
126 000210  000000C 000000G                     .WORD   IE.DNR&377,     $MSG10  ; DEVICE NOT READY
127 000214  000000C 000000G                     .WORD   IE.DAA&377,     $MSG5   ; DEVICE ALREADY ATTACHED
128 000220  000000C 000000                      .WORD   IE.VER&377,     0       ; PARITY ERROR
129 000224  000000C 000000                      .WORD   IE.BBE&377,     0       ; BAD BLOCK
130 000230  000000C 000000G                     .WORD   IE.FHE&377,     $MSG20  ; FATAL HARDWARE ERROR
131 000234  000000C 000000G                     .WORD   IE.PRI&377,     $MSG22  ; PRIVLEGE VIOLATION
132 000240  000000C 000000G                     .WORD   IE.OFL&377,     $MSG7   ; DEVICE OFFLINE
133 000244  000000  000000G                     .WORD   0,              $MSG8   ; END OF TABLE
134
135                                         ;+
136                                         ; **-$WLKER-SET WRITE LOCK ERROR
137                                         ;
138                                         ; THIS ROUTINE WILL SET THE WRITE LOCK ERROR MESSAGE AND EXIT
139                                         ; WITH A SEVERE ERROR STATUS SET.
140                                         ;
141                                         ; INPUTS:
142                                         ;       NONE.
143                                         ;
144                                         ; OUTPUTS:
145                                         ;       R0 = WRITE LOCK ERROR MESSAGE ADDRESS
146                                         ;-
```

```
                                $WLKER::MOV     #$MSG9,R0       ;SET WRITE LOCK MESSAGE ADDRESS
000254  000751                         BR      8$              ;EXIT WITH SEVERE ERROR STATUS

                                .DSABL  LSB



                                ;+
                                ; **-$PRINT-PRINT MESSAGE ON THE USERS TI:
                                ; **-$PRNTO-PRINT MESSAGE ON THE USERS TI: (ALTERNATE ENTRY)
                                ;
                                ; INPUTS:
                                ;       R0 = MESSAGE ADDRESS
                                ;       R1 = CARRIAGE CONTROL (FOR $PRNTO ENTRY ONLY)
                                ;
                                ; OUTPUTS:
                                ;       MESSAGE SENT TO TI:
                                ;-

000256  012701  000040          $PRINT::MOV     #40,R1          ;SET 1 LINE FEED CARRIAGE CONTROL
000262  012705  000000G         $PRNTO::MOV     #$CONPB,R5      ;GET OUTPUT DPB ADDRESS
000266  012765  000000G 000000G         MOV     #IO.WVB,Q.IOFN(R5)      ;SET FUNCTION CODE
000274  010065  000000G                 MOV     R0,Q.IOPL(R5)   ;STORE MESSAGE ADDRESS IN DPB
000300  005065  000002G                 CLR     Q.IOPL+2(R5)    ;CLEAR MESSAGE LENGTH COUNTER IN DPB
000304  010165  000004G                 MOV     R1,Q.IOPL+4(R5) ;SET CARRIAGE CONTROL
000310  105720                  1$:     TSTB    (R0)+           ;END OF MESSAGE STRING?
000312  001403                          BEQ     2$              ;IF EQ YES
000314  005265  000002G                 INC     Q.IOPL+2(R5)    ;NO, CALCULATE MESSAGE LENGTH
000320  000773                          BR      1$              ;GET NEXT CHARACTER

000322                          2$:     DIR$    R5              ;PRINT THE MESSAGE
000326  103004                          BCC     3$              ;IF CC OK
000330  022767  000000G 000000G         CMP     #IE.UPN,$DSW    ;POOL SPACE AVAILABLE?
000336  001771                          BEQ     2$              ;IF EQ NO, TRY AGAIN
000340  000207                  3$:     RETURN



                                ;+
                                ; **-$READ-READ A LINE FROM THE TERMINAL
                                ;
                                ; THIS SUBROUTINE WILL READ A LINE FROM THE CONSOLE
                                ; DEVICE.
                                ;
                                ; INPUTS:
                                ;       NONE.
                                ;
                                ; OUTPUTS:
                                ;       CARRY SET IF ANY ERROR AND
                                ;       R0 = ERROR MESSAGE ADDRESS
                                ;
                                ;       CARRY CLEAR IF READ OK
                                ;-

000342  012705  000000G         $READ:: MOV     #$CONPB,R5      ;GET INPUT DPB ADDRESS
000346  012765  000000G 000000G         MOV     #IO.RVB,Q.IOFN(R5)      ;LOAD FUNCTION CODE
000354  012765  000000G 000000G         MOV     #$BUFRX,Q.IOPL(R5)      ;LOAD BUFFER ADDRESS
```

```
    204 000362  012765  000120  000002G         MOV     #80.,Q.IOPL+2(R5)       ;LOAD MAX NUMBER OF BYTES TO READ
    205 000370                                   DIR$    R5                      ;READ IN THE LINE
    206 000374  10341?                           BCS     2$                      ;IF CS DIRECTIVE ERROR
    207 000376  122767  000000C 000000G         CMPB    #IE.EOF&377,$IOST       ;END OF FILE SEEN?
    208 000404  001406                           BEQ     1$                      ;IF EQ YES
    209 000406  105767  000000G                  TSTB    $IOST                   ;I/O ERROR?
    210 000412  002405                           BLT     2$                      ;IF LT YES
    211 000414  105767  000001G                  TSTB    $IOST+1                 ;CHECK FOR A TERMINATED LINE
    212 000420  001405                           BEQ     3$                      ;IF EQ BUFFER OVERFLOWED
    213 000422  000241                  1$:      CLC                             ;INDICATE READ WAS OK
    214 000424  000207                           RETURN
    215
    216 000426  012700  000000G         2$:      MOV     #$MSG29,R0              ;COMMAND I/O ERROR
    217 000432  000402                           BR      4$
    218 000434  012700  000000G         3$:      MOV     #$MSG30,R0              ;COMMAND TOO LONG
    219 000440  000261                  4$:      SEC                             ;SET ERROR RETURN
    220 000442  000207                           RETURN
    221
    222         000001                  .END
```

SYMBOL TABLE

```
IE.BBE= ****** GX       IE.VER= ****** GX       $CBDMG= ***    GX       $IOBUF= ****** GX       $MSG5 = ****** GX
IE.BLK= ****** GX       IO.RDH= ****** GX       $CONPB= ****** GX       $IOST = ****** GX       $MSG7 = ****** GX
IE.DAA= ****** GX       IO.RVB= ****** GX       $DSKIO  000020RG        $MESAG= ****** GX       $MSG8 = ****** GX
IE.DNR= ****** GX       IO.WCH= ****** GX       $DSKPB= ****** GX       $MSG10= ****** GX       $MSG8A= ****** GX
IE.EOF= ****** GX       IO.WDH= ****** GX       $DSKRH  000006RG        $MSG13= ****** GX       $MSG9 = ****** GX
IE.FHE= ****** GX       IO.WVB= ****** GX       $DSKRT  000030RG        $MSG20= ****** GX       $PRINT  000256RG
IE.HWR= ****** GX       IQ.UMD= ****** GX       $DSKWC  000000RG        $MSG22= ****** GX       $PRNTO  000262RG
IE.OFL= ****** GX       Q.IOFN= ****** GX       $DSKWH  000014RG        $MSG29= ****** GX       $READ   000342RG
IE.PRI= ****** GX       Q.IOPL= ****** GX       $DSW  = ****** GX       $MSG30= ****** GX       $WLKER  000250RG
IE.UPN= ****** GX       $BUFRX= ****** GX       $FUNC = ****** GX

. ABS.  000000     000
        000444     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  481 WORDS  ( 2 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:10
[300,20]FMTIO,[300,30]FMTIO=[300,10]FMTIO
```

```
                        .TITLE  FMTDAT - FORMAT DATA BASE
                        .IDENT  /01.00/
                        ;
                        ;
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                        ;
                        ; C. HESS       17-AUG-80
                        ; M. LEAVITT    26-NOV-80
                        ;

                        .MCALL  UMDIO$

 000000                         UMDIO$  DEF$G                  ;CALL MACRO TO DEFINE DIAGNOSTIC FUNCTION
                                                               ;CODES GLOBALLY

                        ; SPECIAL OPCODES TO BE USED WITH THE FUNCTIONAL 'DR' DRIVER.  NOTE
                        ; THAT THESE FUNCTIONS ARE DEFINED IN THE SPECIAL MANUFACTURING
                        ; 'DR' DRIVER.

          004110        IO.WCH  ==      10*400+110      ; WRITE CHECK HEADER & DATA (DIAGNOSTIC)
          004160        IO.WPD  ==      10*400+160      ; WRITE PHYSICAL BLOCKS (DIAGNOSTIC)
          004170        IO.RPD  ==      10*400+170      ; READ PHYSICAL BLOCKS (DIAGNOSTIC)
          004200        IO.FER  ==      10*400+200      ; READ FE BLOCKS (DIAGNOSTIC)
          004210        IO.FEW  ==      10*400+210      ; WRITE FE BLOCKS (DIAGNOSTIC)
```

```
                                DSKEFN  =       1               ;EVENT FLAG FOR DISK I/O
                                CONEFN  =       2               ;EVENT FLAG FOR CONSOLE I/O
                                SPEFN   ==      3               ;EVENT FLAG FOR SPAWN DIRECTIVE
                                CONLUN  =       2               ;LUN FOR CONSOLE I/O
                                DSKLUN  =-      3               ;LUN FOR DISK I/O
                                DEFSEC  =       31.             ;DEFAULT SECTOR FOR SKIP FLAG
                                $SSFLN  ==      3               ;BLOCK LENGTH OF SKIP SECTOR FILE
                                $SSFHD  ==      11.             ;NUMBER OF WORDS IN HEADER OF SKIP SECTOR FILE
                                $SSFDT  ==      <256.*$SSFLN>-$SSFHD    ;NUMBER OF WORDS IN DATA OF SKIP SECTOR FILE

000000      000     377         $STATS::.BYTE   0,-1            ; FORMAT STATUS, MCR LINE FLAG
000002      104     122         $DVICE::.ASCII  "DR"            ; DISK NAME (ASCII)
000004  000003  131715          $ALFLB::.WORD   3,131715        ; ADDRESS OF ALTERNATE DEC STD 144 TRACK
000010  000003  131656          $SSFLB::.WORD   3,131656        ; ADDRESS OF START OF SKIP SECTOR FILE
000014  000005                  $SSFSZ::.WORD   5               ; NUMBER OF COPIES OF SKIP SECTOR FILE
000016  155555  133333          $PAT::  .WORD   155555,133333   ; DISK FORMAT PATTERN
000022  000024                  $RETRY::.WORD   20.             ; NUMBER OF RE-VERIFICATION ATTEMPTS
000024  040200                  TRKSZ:: .WORD   516.*32.        ; RM80 TRACK SIZE (IN BYTES)
000026  001004                  SECSZ:: .WORD   516.            ; RM80 SECTOR SIZE (INCLUDING HEADER)

                                ;DISK I/O DIRECTIVE PARAMETER BLOCK (QIOW$ DIRECTIVE)

000030      003     014         $DSKPB::.BYTE   3,12.           ; MACRO DIC, DPB SIZE
000032  000000                  $FUNC:: .WORD   0               ; FUNCTION CODE
000034  000003                          .WORD   DSKLUN          ; LUN
000036      001     000                 .BYTE   DSKEFN,0        ; EVENT FLAG, PRIORITY
000040  000110'                          .WORD   $IOST           ; STATUS BLOCK ADDRESS
000042  000000                          .WORD   0               ; AST ADDRESS
000044  000000                  $IOBUF::.WORD   0               ; BUFFER ADDRESS
000046  000000                  $XFRSZ::.WORD   0               ; TRANSFER SIZE IN BYTES
000050  000000                          .WORD   0               ; NOT USED
000052  000000                  $LBNH:: .WORD   0               ; HIGH ORDER LOGICAL BLOCK NUMBER
000054  000000                  $LBNL:: .WORD   0               ; LOW ORDER LOGICAL BLOCK NUMBER
000056  000054'                          .WORD   $RGBUF          ; REGISTER BUFFER ADDRESS

                                ;CONSOLE I/O DIRECTIVE PARAMETER BLOCK (QIOW$ DIRECTIVE)

000060      003     014         $CONPB::.BYTE   3,12.           ; MACRO DIC, DPB SIZE
000062  000000                          .WORD   0               ; FUNCTION CODE
000064  000002                          .WORD   CONLUN          ; CONSOLE LUN
000066      002     000                 .BYTE   CONEFN,0        ; CONSOLE EVENT FLAG, PRIORITY ZERO
000070  000110'                          .WORD   $IOST           ; STATUS BLOCK ADDRESS
000072  000000                          .WORD   0               ; AST ADDRESS
000074  000000                          .WORD   0               ; BUFFER ADDRESS
000076  000000                          .WORD   0               ; MESSAGE BYTE COUNT
000100  000000                          .WORD   0               ; CARRIAGE CONTROL
000102  000000  000000  000000          .WORD   0,0,0           ; NOT USED

000110  000000  000000          $IOST:: .WORD   0,0             ; I/O STATUS BLOCK

                                ;
                                ; DRIVE PARAMETER TABLE
                                ;

000114  000003  131656          $DVPRM::.WORD   3,131656        ; MAXIMUM LBN

                                ; THE ORDER OF THIS TABLE MUST NOT CHANGE
```

```
                                $MXCYL::.WORD   0               ; # OF CYLINDERS PER DISK
                                $MXTRK::.WORD   0               ; # OF TRACKS PER CYLINDER
                                $MXSEC::.WORD   0               ; # OF SECTORS PER TRACK
                                $MBSSZ::.WORD   10.             ; # OF BLOCKS IN MDBSF
                                $UBSSZ::.WORD   20.             ; # OF BLOCKS IN UDBSF

                                ;+
                                ; MACRO FORMAT:  LBN, CYL, TRK, SEC
                                ; WHERE:
                                ;       LBN =   MAXIMUM NUMBER OF BLOCKS ON DEVICE (DOUBLE WORD)
                                ;       CYL =   MAXIMUM NUMBER OF CYLINDERS ON DEVICE
                                ;       TRK =   MAXIMUM NUMBER OF TRACKS ON DEVICE
                                ;       SEC =   MAXIMUM NUMBER OF SECTORS ON DEVICE
                                ;
                                ;-
                                .MACRO  DVPRM   LBN, CYL, TRK, SEC
                                        .WORD   LBN
                                        .WORD   CYL
                                        .BYTE   SEC
                                        .BYTE   TRK
                                .ENDM   DVPRM

                                $LOGDV::DVPRM   <3,131656>, 559., 14., 31.      ; LOGICAL DEVICE GEOMETRY
                                $PHYDV::DVPRM   <3,152700>, 561., 14., 32.      ; PHYSICAL DEVICE GEOMETRY

                                .PSECT  $$$$BF,D

                                $UCB::  .WORD   0               ; ADDRESS OF CURRENT UCB
                                $SCB::  .WORD   0               ; ADDRESS OF CURRECT SCB
                                $INADD::.WORD   0               ; ADDRESS OF INTERRUPT VECTOR
                                $REVNM::.WORD   0               ; TEMP. STORAGE FOR SSF REVISION NUMBER ($SSF+10)
                                $YESNO::.BYTE   0               ; YES/NO CONTINUE RESPONSE
                                $SWERL::.BYTE   0               ; ERROR LIMIT
                                $SWLST::.BYTE   0               ; LIST BAD BLOCK FILE CONTENTS
                                $SWLOG::.BYTE   0               ; LOGICAL LIST SWITCH
                                $SWFMT::.BYTE   0               ; ENABLE FORMAT FLAG
                                $SWFFE::.BYTE   0               ; ENABLE FORMAT FE CYLINDERS ONLY
                                $SWINT::.BYTE   0               ; CREATE THE MDBSF, UDBSF, AND SSF
                                $SWMOD::.BYTE   0               ; MODIFY THE SSF, UDBSF, & FEBSF
                                SKPFRE::.BYTE   0               ; SKIP SECTOR FLAG
                                $VERIF::.BYTE   0               ; NUMBER OF TIMES TO VERIFY THE TRACK

                                .EVEN
                                $SNAME::.WORD   0,0             ; HDA SERIAL NUMBER
                                $RTCNT::.WORD   0               ; RETRY COUNT
                                $DVUNT::.WORD   0               ; DISK UNIT NUMBER
                                $MXLBN::.WORD   0,0             ; MAXIMUM BLOCK NUMBER
                                $HDRFG::.WORD   0               ; HEADER DEFECT FLAG
                                $FLCYL::.WORD   0               ; FAILING CYLINDER ADDRESS
                                $FLTRK::.WORD   0               ;    "     TRACK      "
                                $FLSEC::.WORD   0               ;    "     SECTOR     "
                                $CYL::  .WORD   0               ; CURRENT CYLINDER
                                $TRK::  .WORD   0               ; CURRENT TRACK
                                $SEC::  .WORD   0               ; CURRENT SECTOR

                                ;BUFFERS AND DATA STORAGE AREA
```

```
                                        ;RGBUF::.BLKW   25.             ; RM80 REGISTER RETURN BUFFER
                                        $BUF::  .BLKW   32.*258.        ; BUFFER FOR DISK I/O
                                        $BUFRX::.BLKW   200.            ; DIRECTIVE BUFFER
                040336'                 $BUFX==$BUFRX                   ; BUFFER FOR DIRECTIVE USE

                                        ;BAD SECTOR AND DEFECT STORAGE AREA

                                        $MDBSF::.BLKW   256.            ; BUFFER FOR 16 BIT MDBSF
                                        $UDBSF::.BLKW   256.            ; BUFFER FOR 16 BIT UDBSF
                                        $SSF::  .BLKW   256.*<$SSFLN>   ; BUFFER FOR 16 BIT SKIP SECTOR FILE
                                        $FEBSF::.BLKW   64.             ; BUFFER FOR FE CYLINDER DEFECTS

                000001                  .END
```

SYMBOL TABLE

```
CONEFN= 000002          IO.WCH= 004110 G        $DVPRM  000114RG        $MXLBN  000032RG    002 $SSFSZ  000014RG
CONLUN= 000002          IO.WCK= 004050 G        $DVUNT  000030RG    002 $MXSEC  000124RG        $STATS  000000RG
DEFSEC= 000037          IO.WDH= 004040 G        $FEBSF  046156RG    002 $MXTRK  000122RG        $SWERL  000011RG    002
DSKEFN= 000001          IO.WPD= 004160 G        $FLCYL  000040RG    002 $PAT    000016RG        $SWFFE  000015RG    002
DSKLUN= 000003 G        IO.WTD= 004130 G        $F_SEC  000044RG    002 $PHYDV  000142RG        $SWFMT  000014RG    002
IO.BLS= 004010 G        IO.UMD= 000004 G        $FLTRK  000042RG    002 $RETRY  000022RG        $SWINI  000016RG    002
IO.DGN= 004150 G        SECSZ   000026RG        $FUNC   000032RG        $REVNM  000006RG    002 $SWLOG  000013RG    002
IO.FER= 004200 G        SKPFRE  000020RG    002 $HDRFG  000036RG    002 $RGBUF  000054RG    002 $SWLST  000012RG    002
IO.FEW= 004210 G        SPEFN = 000003 G        $INADD  000004RG    002 $RTCNT  000026RG    002 $SWMOD  000017RG    002
IO.HMS= 004000 G        TRKSZ   000024RG        $IOBUF  000044RG        $SCB    000002RG    002 $TRK    000050RG    002
IO.LPC= 004100 G        $ALFLB  000004RG        $IOST   000110RG        $SEC    000052RG    002 $UBSSZ  000130RG
IO.OFF= 004020 G        $BUF    000136RG    002 $LBNH   000052RG        $SNAME  000022RG    002 $UCB    000000RG    002
IO.RDH= 004030 G        $BUFRX  040336RG    002 $LBNL   000054RG        $SSF    043156RG    002 $UDBSF  042156RG    002
IO.RNF= 004060 G        $BUFX = 040336RG    002 $LOGDV  000132RG        $SSFDT= 001365 G        $VERIF  000021RG    002
IO.RNR= 004070 G        $CONPB  000060RG        $MBSSZ  000126RG        $SSFHD= 000013 G        $XFRSZ  000046RG
IO.RPD= 004170 G        $CYL    000046RG    002 $MDBSF  041156RG    002 $SSFLB  000010RG        $YESNO  000010RG    002
IO.RTD= 004120 G        $DSKPB  000030RG        $MXCYL  000120RG        $SSFLN= 000003 G        ...GBL= 000001
IO.TDD= 004140 G        $DVICE  000002RG

. ABS.  000000      000
        000152      001
$$$$BF  046356      002
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  898 WORDS  ( 4 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:12
[300,20]FMTDAT,[300,30]FMTDAT=[300,10]FMTDAT
```

```
                        .TITLE  FMTMSG - MESSAGE OUTPUT ROUTINES
                        .IDENT  /01.00/
                        ;
                        ; COPYRIGHT (C) 1980
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                        ;
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                        ; VERSION 01.00
                        ;
                        ; C. HESS       15-AUG-80
                        ; M. LEAVITT    23-OCT-80
                        ;

                        .NLIST  CND,BEX

                        .MCALL  DIR$
```

```
   000000    015    000           $CR::    .ASCIZ   <CR>
   000002    052    052    052    $STARS::.ASCIZ   /**********/<LF>
   000016    015    106    115    $MSG1:: .ASCIZ   <CR>/FMT -- /
   000027    123    131    116    $MSG2:: .ASCIZ   /SYNTAX ERROR/
   000044    104    105    126    $MSG4:: .ASCIZ   /DEVICE NOT IN SYSTEM/
   000071    106    101    111    $MSG5:: .ASCIZ   /FAILED TO ATTACH DEVICE/
   000121    012    012    123    $MSG6:: .ASCIZ   <LF><LF>/START FORMATTING/
   000144    040    055    101    $MSG6A::.ASCIZ   / -ALL CYLINDERS-/<CR>
   000166    040    055    106    $MSG6B::.ASCIZ   / -FE CYLINDERS-/<CR>
   000207    104    122    111    $MSG7:: .ASCIZ   /DRIVE OFFLINE/
   000225    125    116    122    $MSG8:: .ASCII   /UNRECOVERABLE ERROR -/
   000252    040    040    040    $MSG8A::.ASCIZ   /      /
   000260    104    105    126    $MSG9:: .ASCIZ   /DEVICE WRITE LOCKED/
   000304    104    105    126    $MSG10::.ASCIZ   /DEVICE NOT READY/
   000325    012    123    124    $MSG11::.ASCIZ   <LF>/START VERIFICATION/
   000351    012    104    117    $MSG12::.ASCIZ   <LF>/DONE !/
   000361    104    105    126    $MSG13::.ASCIZ   /DEVICE DRIVER MISSING/
   000407    103    131    114    $MSG15::.ASCIZ   /CYLINDER=/
   000421    124    122    101    $MSG16::.ASCIZ   /TRACK=/
   000430    123    105    103    $MSG17::.ASCIZ   /SECTOR=/
   000440    115    104    102    $MSG18::.ASCIZ   /MDBSF COPY CORRUPT/
   000463    125    104    102    $MSG19::.ASCIZ   /UDBSF COPY CORRUPT/
   000506    106    101    124    $MSG20::.ASCIZ   /FATAL HARDWARE ERROR/
   000533    106    101    111    $MSG21::.ASCIZ   /FAILED TO READ MDBSF COPY/
   000565    120    122    111    $MSG22::.ASCIZ   /PRIVILEGE VIOLATION/
   000611    012    007    052    $MSG23::.ASCIZ   <LF><07>/** WARNING - DATA WILL BE LOST ON /
   000656    072    040    052    $MSG24::.ASCIZ   /: **/<07>
   000664    015    106    115    $MSG25::.ASCIZ   <CR>/FMT>/
   000672    125    116    101    $MSG26::.ASCIZ   /UNABLE TO RECOVER MDBSF/
   000722    126    105    103    $MSG27::.ASCIZ   /VECTOR NOT MULTIPLE OF FOUR/
   000756    103    123    122    $MSG28::.ASCIZ   /CSR ADDRESS NOT IN SYSTEM/
   001010    103    117    115    $MSG29::.ASCIZ   @COMMAND I/O ERROR@
   001032    103    117    115    $MSG30::.ASCIZ   /COMMAND TOO LONG/
   001053    012    103    117    $MSG31::.ASCIZ   <LF>/CONTINUE (L) N ? /
   001076    122    105    123    $MSG32::.ASCIZ   /RESPONSE OUT OF RANGE/
   001124    111    116    103    $MSG40::.ASCIZ   /INCORRECT MDBSF SERIAL NUMBER/
   001162    125    116    101    $MSG41::.ASCIZ   /UNABLE TO RECOVER SSF/
   001210    125    116    101    $MSG42::.ASCIZ   /UNABLE TO RECOVER UDBSF/
   001240    125    116    101    $MSG43::.ASCIZ   /UNABLE TO READ UDBSF/
   001265    111    116    103    $MSG44::.ASCIZ   /INCORRECT UDBSF SERIAL NUMBER/
   001323    105    122    122    $MSG45::.ASCIZ   /ERROR LIMIT EXCEEDED/
   001350    125    116    101    $MSG58::.ASCIZ   /UNABLE TO READ SKIP SECTOR FILE COPY/
   001415    123    113    111    $MSG59::.ASCIZ   /SKIP SECTOR FILE COPY IS CORRUPT/
   001456    015    104    122    $MSG70::.ASCIZ   <CR>/DRIVE #: /
   001471    015    117    120    $MSG71::.ASCIZ   <CR>/OPTIONS: /
   001504    104    122    111    $MSG72::.ASCIZ   /DRIVE NOT PRESENT/
   001526    104    122    111    $MSG73::.ASCIZ   /DRIVE NOT AN RM80/
   001550    125    120    104    $MSGR8::.ASCIZ   /UPDATE MODE (L) N ? /

                                  .EVEN
```

```
                                        ;+
                                        ; **-$MESAG-OUTPUT MESSAGE WITH CURRENT EXIT STATUS
                                        ; **-$MSGWR-OUTPUT MESSAGE WITH WARNING EXIT STATUS
                                        ;
                                        ; INPUTS:
                                        ;       R0 = ADDRESS OF ''ASCIZ'' MESSAGE STRING
                                        ;-

001576  112767  000000G 000000G $MSGWR::MOVB    #EX$WAR,$STATS  ;SET WARNING EXIT STATUS
001604  010046                  $MESAG::MOV     R0,-(SP)        ;SAVE MESSAGE ADDRESS
001606  012700  000000G                 MOV     #$BUF,R0        ;GET PRINT BUFFER ADDRESS
001612  012703  000016'                MOV     #$MSG1,R3       ;GET PREFIX ADDRESS
001616  004767  000000G                 CALL    $MOVE           ;STORE PREFIX
001622  012603                         MOV     (SP)+,R3        ;GET BASIC MESSAGE ADDRESS
001624  004767  000000G                 CALL    $MOVE           ;STORE BASIC MESSAGE
001630  112720  000012                 MOVB    #12,(R0)+       ;ADD AN ADDITIONAL LINE FEED
001634  105010                         CLRB    (R0)            ;TERMINATE THE BUFFER
001636  012700  000000G                 MOV     #$BUF,R0        ;SET MESSAGE BUFFER ADDRESS
001642  004767  000000G                 CALL    $PRINT          ;PRINT THE MESSAGE

001646  012767  000000C 000000G $FMTEX::MOV     #IO.DET!IQ.UMD,$FUNC    ;LOAD DETACH FUNCTION CODE
001654                                  DIR$    #$DSKPB         ;DETACH DISK (WHO CARES IF IT FAILS!!)
001662  000167  000000G                 JMP     $FMTEP          ;RESTART

        000C01                  .END
```

SYMBOL TABLE

```
CR    = 000015          $MSGR8  001550RG        $MSG20  000506RG        $MSG4   000044RG        $MSG6B  000166RG
EXSWAR= ****** GX       $MSGWR  001576RG        $MSG21  000533RG        $MSG40  001124RG        $MSG7   000207RG
IO.DET= ****** GX       $MSG1   000016RG        $MSG22  000565RG        $MSG41  001162RG        $MSG70  001456RG
IQ.UMD= ****** GX       $MSG10  000304RG        $MSG23  000611RG        $MSG42  001210RG        $MSG71  001471RG
LF    = 000012          $MSG11  000325RG        $MSG24  000656RG        $MSG43  001240RG        $MSG72  001504RG
$BUF  = ****** GX       $MSG12  000351RG        $MSG25  000664RG        $MSG44  001265RG        $MSG73  001526RG
$CR     000000RG        $MSG13  000361RG        $MSG26  000672RG        $MSG45  001323RG        $MSG8   000225RG
$DSKPB= ****** GX       $MSG15  000407RG        $MSG27  000722RG        $MSG5   000071RG        $MSG8A  000252RG
$FMTEP= ****** GX       $MSG16  000421RG        $MSG28  000756RG        $MSG58  001350RG        $MSG9   000260RG
$FMTEX  001646RG        $MSG17  000430RG        $MSG29  001010RG        $MSG59  001415RG        $PRINT= ****** GX
$FUNC = ****** GX       $MSG18  000440RG        $MSG30  001032RG        $MSG6   000121RG        $STARS  000002RG
$MESAG  001604RG        $MSG19  000463RG        $MSG31  001053RG        $MSG6A  000144RG        $STATS= ****** GX
$MOVE = ****** GX       $MSG2   000027RG        $MSG32  001076RG

. ABS.  000000      000
        000056      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  618 WORDS  ( 3 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:10
[300,20]FMTMSG,[300,30]FMTMSG=[300,10]FMTMSG
```

```
                        .TITLE  FMTSUB - FORMAT SUBROUTINES
                        .IDENT  /01.00/
                        ;
                        ;
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                        ;
                        ; VERSION 01.00
                        ;
                        ; C. HESS       21-AUG-80
                        ; M. LEAVITT    14-JAN-81
                        ;
```

```
                                        ;+
                                        ; **-$MVPAT-LOAD THE DATA BUFFER WITH THE DISK DATA PATTERN
                                        ;
                                        ; INPUTS:
                                        ;       NONE
                                        ;
                                        ; OUTPUTS:
                                        ;       '$BUF' LOADED WITH '$PAT' & '$PAT+2'
                                        ;
                                        ;-
000000  016701  000000G       $MVPAT::MOV     TRKSZ,R1        ; LOAD THE DISTRIBUTION COUNTER
000004  006201                        ASR     R1              ; CONVERT BYTE COUNT TO WORD COUNT
000006  006201                        ASR     R1              ; CONVERT TO 2 WORD COUNT
000010  012700  000000G               MOV     #$BUF,R0        ; BUFFER POINTER
000014  016720  000000G       1$:     MOV     $PAT,(R0)+      ; MOVE THE PATTERN
000020  016720  000002G               MOV     $PAT+2,(R0)+    ;
000024  005301                        DEC     R1              ; DECREMENT THE DISTRIBUTION COUNTER
000026  100372                        BPL     1$              ; IF PL, MORE TO DO
000030  000207                        RETURN                  ;

                                        ;+
                                        ; OUTPUT ERROR MESSAGE
                                        ;
                                        ; INPUTS:
                                        ;       R1 = VALUE TO CONVERT
                                        ;       R3 = ADDRESS OF BASIC MESSAGE
                                        ;
                                        ; OUTPUTS:
                                        ;       NONE.
                                        ;-

000032  012700  000000G       $EROUT::MOV     #$BUFRX,R0      ; GET OUTPUT BUFFER ADDDRESS
000036  004767  000176                CALL    $MOVE           ;STORE BASIC MESSAGE
000042  005002                        CLR     R2              ;SUPRESS LEADING 0'S
000044  004767  000000G               CALL    $CBDMG          ;CONVERT TO DECIMAL
000050  112720  000056       ERROU1: MOVB    #'.,(R0)+       ;STUFF DECIMAL INDICATOR
000054  112720  000040               MOVB    #' ,(R0)+       ;STUFF BLANK IN MESSAGE
000060  105010                        CLRB    (R0)            ;TERMINATE STRING
000062  005001                        CLR     R1              ;SET NULL CARRIAGE CONTROL
000064  012700  000000G               MOV     #$BUFRX,R0      ; GET OUTPUT BUFFER ADDRESS
000070  000167  000000G               JMP     $PRNTO          ;PRINT MESSAGE

                                        ;+
                                        ; **-$EROCT-CONVERT TO OCTAL AND PRINT
                                        ;       INPUTS:
                                        ;               R1 = VALUE TO CONVERT
                                        ;               R3 = MESSAGE ADDRESS
                                        ;       OUTPUTS:
                                        ;               MESSAGE PRINTED ON TI:
                                        ;-

000074  012700  000000G       $EROCT::MOV     #$BUFRX,R0      ;
000100  004767  000134                CALL    $MOVE           ;
000104  105202                        INCB    R2              ;INCLUDE LEADING ZEROS
000106  004767  000000G               CALL    $CBOMG          ;CONVERT TO OCTAL
000112  112720  000040               MOVB    #' ,(R0)+       ;STUFF BLANK IN MESSAGE
```

```
000116  105010                          CLRB    (R0)            ;TERMINATE STRING
000120  005001                          CLR     R1              ;SET NULL CARRIAGE CONTROL
000122  012700  000000G                 MOV     #$BUFRX,R0      ;
000126  004767  000000G                 CALL    $PRNTO          ;SEND MESSAGE


                                ;+
                                ; **-$CVTDA-CONVERT DISK ADDRESS TO LOGICAL BLOCK NUMBER
                                ;
                                ; THIS SUBROUTINE CONVERTS A DISK ADDRESS TO A LOGICAL
                                ; BLOCK NUMBER.  THE FORMULA USED IS:
                                ;       BLK = ($CYL * $MXTRK + $TRK) * $MXSEC + $SEC
                                ;
                                ; INPUTS:
                                ;       $CYL = CYLINDER NUMBER
                                ;       $TRK = TRACK NUMBER
                                ;       $SEC = SECTOR NUMBER
                                ;
                                ; OUTPUTS:
                                ;       $LBNH = HIGH ORDER BLOCK NUMBER
                                ;       $LBNL = LOW ORDER BLOCK NUMBER
                                ;-

000132  016701  000000G         $CVTDA::MOV     $CYL,R1         ; GET CYLINDER NUMBER
000136  016700  000000G                 MOV     $MXTRK,R0       ; GET TRACKS PER CYLINDER
000142  004767  000174                  CALL    $MULT           ; MULTIPLY
000146  016700  000000G                 MOV     $TRK,R0         ; GET TRACK NUMBER
000152  060100                          ADD     R1,R0           ; ADD TO PARTIAL TOTAL
000154  016701  000000G                 MOV     $MXSEC,R1       ; GET SECTORS PER TRACK
000160  004767  000156                  CALL    $MULT           ; MULTIPLY
000164  066701  000000G                 ADD     $SEC,R1         ; ADD IN SECTOR
000170  005500                          ADC     R0              ; DON'T FORGET CARRY
000172  010067  000000G                 MOV     R0,$LBNH        ; SAVE HIGH ORDER BLOCK NUMBER
000176  010167  000000G                 MOV     R1,$LBNL        ; SAVE LOW ORDER BLOCK NUMBER
000202  000207                          RETURN                  ;


                                ;+
                                ; **-$HOMSK-ISSUE A HOME SEEK FUNCTION
                                ;
                                ; THIS SUBROUTINE WILL ISSUE A HOME SEEK FUNCTION.
                                ;
                                ; INPUTS:
                                ;       NONE.
                                ;
                                ; OUTPUTS:
                                ;       HOME SEEK ISSUED TO DISK.
                                ;-

000204  005067  000000G         $HOMSK::CLR     $LBNH           ;RESET BLOCK NUMBER
000210  005067  000000G                 CLR     $LBNL           ;
000214  012767  000010  000000G         MOV     #10,$XFRSZ      ;DUMMY UP BYTE COUNT
000222  012703  000000C                 MOV     #IO.HMS!IQ.UMD,R3       ;SET HOME SEEK FUNCTION CODE
000226  012705  000000G                 MOV     #$BUF,R5        ;SETUP DEFAULT BUFFER ADDRESS
000232  000167  000000G                 JMP     $DSKIO          ;DO THE FUNCTION AND EXIT
000236  000207                  1$:     RETURN
```

```
                                        ;+
                                        ; **-$MOVE-MOVE ASCIZ STRING INTO BUFFER
                                        ;
                                        ; THIS SUBROUTINE WILL MOVE AN ASCIZ STRING INTO A BUFFER.
                                        ;
                                        ; INPUTS:
                                        ;       R0 = ADDRESS OF BUFFER.
                                        ;       R3 = ADDRESS OF ASCIZ TEXT TO MOVE.
                                        ;
                                        ; OUTPUTS:
                                        ;       R0 = POINTS TO NEXT PLACE IN BUFFER.
                                        ;-

000240  112320          $MOVE:: MOVB    (R3)+,(R0)+     ;STORE TEXT CHARACTER
000242  001376                  BNE     $MOVE           ;IF NE CONTINUE TO STORE
000244  105740                  TSTB    -(R0)           ;POINT TO NEXT BUFFER POSITION
000246  000207                  RETURN                  ;

                                        ;+
                                        ; **-$PRMPT-PROMPT USER AND SOLICIT A RESPONSE
                                        ;
                                        ; THIS SUBROUTINE WILL PROMPT THE USER AND THEN WAIT FOR HIS
                                        ; RESPONSE.
                                        ;
                                        ; INPUTS:
                                        ;       R0 = ADDRESS OF PROMPT MESSAGE.
                                        ;
                                        ; OUTPUTS:
                                        ;       R3 = BYTE COUNT
                                        ;       BUFFER IS TERMINATED
                                        ;       Z = 1 IF BYTE COUNT IS ZERO
                                        ;       Z = 0 IF BYTE COUNT IS NON-ZERO
                                        ;-

000250  012701  000044  $PRMPT::MOV     #'$,R1          ;SET CARRIAGE CONTROL
000254  004767  000000G         CALL    $PRNTO          ;PROMPT THE USER
000260  005067  000000G         CLR     $BUFRX          ;CLEAR USER'S RESPONSE BUFFER
000264  004767  000000G         CALL    $READ           ;GET THE USERS RESPONSE
000270  103422                  BCS     MSG             ;IF CS ERROR
000272  016703  000002G         MOV     $IOST+2,R3      ;GET BYTE COUNT
000276  105063  000000G         CLRB    $BUFRX(R3)      ;TERMINATE THE LINE
000302  012700  000000G         MOV     #$BUFRX,R0      ;GET INPUT BUFFER ADDRESS
000306  121027  000141  1$:     CMPB    (R0),#141       ;LOWER CASE LETTER?
000312  103405                  BLO     2$              ;IF LO NO
000314  121027  000172          CMPB    (R0),#172       ;LOWER  ASE LETTER?
000320  101002                  BHI     2$              ;IF HI NO
000322  142710  000040          BICB    #40,(R0)        ;YES, CONVERT TO UPPER CASE
000326  105720          2$:     TSTB    (R0)+           ;END OF INPUT BUFFER?
000330  001366                  BNE     1$              ;IF NE NO
000332  005703                  TST     R3              ;TEST FOR NULL LINE
000334  000207                  RETURN                  ;
000336  000167  000000G MSG:     JMP     $MSGWR          ;EXIT WITH WARNING STATUS

                                        ;+
                                        ; **-$MULT-INTEGER MULTIPLY ROUTINE
                                        ;
                                        ; INPUTS:
```

```
                                ;       R0 = MULTIPLIER
                                ;       R1 = MULTIPLICAND
                                ;
                                ; OUTPUTS:
                                ;       R0 = HIGH ORDER RESULT
                                ;       R1 = LOW ORDER RESULT
                                ;
                                ; ALL REGISTERS ARE PRESERVED
                                ;
                                ;-
                                $MULT:: MOV     R0,-(SP)        ; SAVE MULTIPLIER FOR ADDS
000342  010046
                                        MOV     #21,-(SP)       ; SET LOOP COUNT
000344  012746  000021
                                        CLR     R0              ; CLEAR HIGH PART
000350  005000
                                1$:     ROR     R0              ; DOUBLE RIGHT SHIFT
000352  006000
                                        ROR     R1              ;
000354  006001
                                        BCC     2$              ; IF CC, DO NOT ADD
000356  103002
                                        ADD     2(SP),R0        ; ADD MULTIPLIER TO RESULT
000360  066600  000002
                                2$:     DEC     (SP)            ; DECREMENT THE LOOP COUNT
000364  005316
                                        BGT     1$              ; IF GT, MORE TO DO
000366  003371
                                        CMP     (SP)+,(SP)+     ; PRUNE STACK
000370  022626
                                        RETURN                  ;
000372  000207

                                ;+
                                ; **-SSFCRC-COMPUTE CHECKSUM OVER SSF DATA
                                ;
                                ; THIS ROUTINE WILL COMPUTE THE CHECKSUM OVER THE SPECIFIED
                                ; DATA AREA OF AN SSF COPY.
                                ;
                                ; INPUTS:
                                ;       R0 = STARTING ADDRESS
                                ;       R1 = LENGTH OF DATA AREA
                                ;
                                ; OUTPUTS:
                                ;       R0 =    POINTS TO CHECKSUM WORD
                                ;       R1 =    CHECKSUM
                                ;-

                                SSFCRC: MOV     #1,-(SP)        ; INITIALIZE CHECKSUM
000374  012746  000001
                                1$:     ADD     (R0)+,(SP)      ; ADD DATA WORD TO CHECKSUM
000400  062016
                                        ROL     (SP)            ; ROTATE CHECKSUM
000402  006116
                                        DEC     R1              ; ALL DONE ?
000404  005301
                                        BNE     1$              ; IF NE, NO
000406  001374
                                        MOV     (SP)+,R1        ; GET CHECKSUM RESULT
000410  012601
                                        RETURN                  ;
000412  000207

                                ;+
                                ; **-$UPDMX-UPDATE MAXIMUM VALUES FOR DEVICE GEOMETRY
                                ;
                                ; THIS ROUTINE WILL REPLACE THE CURRENT MAXIMUM VALUES FOR THE
                                ; RM80'S CURRENT GEOMETRY WITH THE VALUES SUPPLIED IN THE
                                ; SPECIFIED TABLE.
                                ;
                                ; INPUTS:
                                ;       R3 =    POINTER TO SPECIFIED TABLE
                                ;
                                ; OUTPUTS:
```

```
                                ;       R3 =    POINTS PAST END OF SPECIFIED TABLE
                                ;       $MXLBN, $MXLBN+2, $MXCYL, $MXTRK, AND $MXSEC ARE ALL UPDATED
                                ;
                                ;-

000414  012367  000000G        $UPDMX::MOV     (R3)+,$MXLBN    ;SET UP MAX LBN
000420  012367  000002G                MOV     (R3)+,$MXLBN+2  ;...
000424  012367  000000G                MOV     (R3)+,$MXCYL    ;SET UP MAX CYLINDER
000430  112367  000000G                MOVB    (R3)+,$MXSEC    ;SETUP MAX SECTOR
000434  112367  000000G                MOVB    (R3)+,$MXTRK    ;SETUP MAX TRACK
000440  166767  000000G 000002G        SUB     $MXSEC,$MXLBN+2 ;DO NOT FORMAT LAST TRACK
000446  005667  000000G                SBC     $MXLBN          ;...
000452  000207                        RETURN                  ;

                                ;+
                                ; **-$TSTDA-TEST FOR A VALID DISK ADDRESS (BLOCK NUMBER)
                                ;
                                ; THIS SUBROUTINE WILL CONVERT THE DISK ADDRESS TO A LBN AND
                                ; CHECK IF THE LOGICAL BLOCK NUMBER IS WITHIN RANGE.
                                ;
                                ; INPUTS:
                                ;       $SEC, $TRK, $CYL SET TO A VALUE.
                                ;
                                ; OUTPUTS:
                                ;       CS      IF LBN OUT OF RANGE
                                ;       CC      IF LBN IN RANGE
                                ;-

000454  004767  177452         $TSTDA::CALL    $CVTDA          ;CONVERT PARAMETERS TO LBN
000460  126767  000000G 000000G        CMPB    $LBNH,$MXLBN    ;HIGH BLOCK # IN RANGE?
000466  101007                        BHI     2$              ;IF HI NO
000470  103404                        BLO     1$              ;IF LO YES
000472  026767  000000G 000002G        CMP     $LBNL,$MXLBN+2  ;LOW BLOCK # IN RANGE?
000500  101002                        BHI     2$              ;IF HI NO
000502  000241                1$:     CLC                     ;SHOW LBN OK
000504  000207                        RETURN                  ;
000506  000261                2$:     SEC                     ;SHOW LBN BAD
000510  000207                        RETURN                  ;


                                ;+
                                ; **-$TSTMX-TEST FOR END OF DISK AND UPDATE DISK PARAMETERS
                                ;
                                ; THIS SUBROUTINE WILL UPDATE THE DISK PARAMETERS AND TEST
                                ; IF THE PARAMETERS WILL OVERFLOW THE DISK.
                                ;
                                ; INPUTS:
                                ;       $CYL = CURRENT CYLINDER NUMBER
                                ;       $TRK = CURRENT TRACK NUMBER
                                ;       $SEC = CURRENT SECTOR NUMBER
                                ;
                                ; OUTPUTS:
                                ;       CS      IF UPDATED PARAMETERS EXCEED DISK LIMITS
                                ;       CC      IF UPDATED PARAMETERS ARE STILL VALID.
                                ;       $SEC = 0 IF NORMAL MODE.
                                ;-
```

```
000512  005067  000000G          $TSTMX::CLR     $SEC            ; START WITH SECTOR ZERO
000516  005267  000000G                  INC     $TRK            ; UPDATE TRACK NUMBER
000522  026767  000000G 000000G 10$:     CMP     $TRK,$MXTRK     ; IS TRACK NUMBER EXCEEDED?
000530  103404                          BLO     20$             ; IF LO, NO
000532  005067  000000G                  CLR     $TRK            ; RESET TRACK NUMBER
000536  005267  000000G                  INC     $CYL            ; UPDATE CYLINDER NUMBER
000542  026767  000000G 000000G 20$:     CMP     $CYL,$MXCYL     ; IS CYLINDER NUMBER EXCEEDED?
000550  001402                          BEQ     30$             ; IF EQ YES
000552  000241                          CLC                     ; INDICATE VALID PARAMETERS
000554  000207                          RETURN                  ;
000556  000261                  30$:    SEC                     ; INDICATE PARAMETERS EXCEEDED
000560  000207                          RETURN                  ;

                                ;+
                                ; **-$UNTID-PUT MESSAGE AND DEVICE/UNIT INTO BUFFER
                                ;
                                ; THIS SUBROUTINE WILL STORE THE MESSAGE AND THE DEVICE AND UNIT
                                ; NUMBER INTO THE BUFFER.
                                ;
                                ; INPUTS:
                                ;       R3 = ADDRESS OF MESSAGE
                                ;
                                ; OUTPUTS:
                                ;       R0 = NEXT BUFFER POSITION
                                ;-

000562  012700  000144G          $UNTID::MOV     #$BUF+100.,R0   ;SET BUFFER ADDRESS
000566  004767  177446                  CALL    $MOVE           ;PUT MESSAGE INTO BUFFER
000572  116720  000000G                  MOVB    $DVICE,(R0)+    ;STORE DEVICE NAME
000576  116720  000001G                  MOVB    $DVICE+1,(R0)+  ;
000602  005001                          CLR     R1              ;GET READY FOR THE BISB
000604  156701  000000G                  BISB    $DVUNT,R1       ;GET UNIT NUMBER
000610  005002                          CLR     R2              ;SUPPRESS LEADING 0'S
000612  000167  000000G                  JMP     $CBOMG          ;CONVERT UNIT NUMBER TO ASCII


                                ;+
                                ; **-$RDBSF-READ MANUFACTURER'S & USER BAD SECTOR FILES
                                ;
                                ; THIS SUBROUTINE WILL READ THE MDBSF AND THE UDBSF.
                                ; IF WE ARE RE-WRITING THE LAST TRACK, A EMPTY MDBSF AND UDBSF
                                ; IS RETURNED.
                                ;
                                ; INPUTS:
                                ;       $MXLBN = DISK ADDRESS OF START OF MDBSF.
                                ;
                                ; OUTPUTS:
                                ;       A GOOD SECTOR OF THE MDBSF AND THE UDBSF ARE READ INTO
                                ;        THEIR BUFFERS
                                ;-

000616  012703  000000G          $RDBSF::MOV     #$LOGDV,R3      ; LOGICAL DEVICE ADDRESS POINDER
000622  004767  177566                  CALL    $UPDMX          ; UPDATE THE ADDRESS VALUES
000626  016767  000000G 000000G         MOV     $MXLBN,$LBNH    ; SET DISK ADDRESS OF MDBSF
000634  016767  000002G 000000G         MOV     $MXLBN+2,$LBNL  ;
```

```
                                        ; READ THE MDBSF
                                        
000642  016701  000000G          1$:   MOV     $MBSSZ,R1       ; GET NUMBER OF BLOCKS IN MDBSF
000646  006201                        ASR     R1              ; DIVIDE BY 2
000650  000405                        BR      3$              ;
000652  062767  000002  000000G  2$:   ADD     #2,$LBNL        ; TRY NEXT USABLE MDBSF BLOCK
000660  005567  000000G               ADC     $LBNH           ;
000664  012705  000000G          3$:   MOV     #$MDBSF,R5      ; GET ADDRESS OF MDBSF BUFFER
000670  004767  000222                CALL    RDBSF           ; READ THE MDBSF
000674  103017                        BCC     6$              ; IF CC OK
000676  012700  000000G               MOV     #$MSG21,R0      ; CAN'T READ MDBSF
000702  005301                   4$:  DEC     R1              ; MORE MDBSF BLOCKS AVAILABLE?
000704  001006                        BNE     5$              ; IF NE YES
000706  004767  000000G               CALL    $PRINT          ; PRINT THE ERROR MESSAGE
000712  012700  000000G               MOV     #$MSG26,R0      ; UNABLE TO RECOVER THE MDBSF
000716  000167  000000G               JMP     $MSGWR          ; EXIT
000722  010146                   5$:  MOV     R1,-(SP)        ; SAVE THE MDBSF COUNT
000724  004767  000000G               CALL    $PRINT          ; PRINT THE MESSAGE
000730  012601                        MOV     (SP)+,R1        ; RESTORE R1
000732  000747                        BR      2$              ; TRY AGAIN
000734  004567  000176           6$:  JSR     R5,VYBSF        ; VERIFY THE MDBSF COPY
000740  000000G                       .WORD   $MDBSF          ; MDBSF BUFFER POINTER
000742  000000G                       .WORD   $MSG40          ; BAD S/N MSG POINTER
000744  000000G                       .WORD   $MSG18          ; MDBSF CORRUPT MSG POINTER
000746  103755                        BCS     4$              ; IF CS, MDBSF CORRUPT
000750  004767  001506                CALL    $SRTMF          ; SORT THE MDBSF

                                        ; READ THE UDBSF

000754  016767  000000G 000000G          MOV     $MXLBN,$LBNH    ; SET DISK ADDRESS OF UDBSF
000762  016767  000002G 000000G          MOV     $MXLBN+2,$LBNL  ;
000770  066767  000000G 000000G          ADD     $MBSSZ,$LBNL    ; ADDRESS OF THE UDBSF
000776  005567  000000G                  ADC     $LBNH           ;
001002  016701  000000G                  MOV     $UBSSZ,R1       ; GET NUMBER OF BLOCKS IN UDBSF
001006  006201                           ASR     R1              ; DIVIDE BY 2
001010  000405                           BR      8$              ;
001012  062767  000002  000000G  7$:     ADD     #2,$LBNL        ; TRY NEXT USABLE UDBSF BLOCK
001020  005567  000000G                  ADC     $LBNH           ;
001024  012705  000000G          8$:     MOV     #$UDBSF,R5      ; GET ADDRESS OF UDBSF BUFFER
001030  004767  000062                   CALL    RDBSF           ; READ THE UDBSF
001034  103017                           BCC     11$             ; IF CC OK
001036  012700  000000G                  MOV     #$MSG43,R0      ; CAN'T READ UDBSF
001042  005301                   9$:     DEC     R1              ; MORE UDBSF BLOCKS AVAILABLE?
001044  001006                           BNE     10$             ; IF NE, YES
001046  004767  000000G                  CALL    $PRINT          ; PRINT THE ERROR MESSAGE
001052  012700  000000G                  MOV     #$MSG42,R0      ; UNABLE TO RECOVER THE UDBSF
001056  000167  000000G                  JMP     $MSGWR          ; EXIT
001062  010146                   10$:    MOV     R1,-(SP)        ; SAVE THE MDBSF COUNT
001064  004767  000000G                  CALL    $PRINT          ; PRINT THE MESSAGE
001070  012601                           MOV     (SP)+,R1        ; RESTORE R1
001072  000747                           BR      7$              ; TRY AGAIN
001074  004567  000036           11$:    JSR     R5,VYBSF        ; VERIFY THE UDBSF COPY
001100  000000G                          .WORD   $UDBSF          ; UDBSF BUFFER POINTER
001102  000000G                          .WORD   $MSG44          ; BAD S/N MSG POINTER
001104  000000G                          .WORD   $MSG19          ; UDBSF CORRUPT MSG POINTER
001106  103755                           BCS     9$              ; IF CS, UDBSF CORRUPT
001110  004767  001402                   CALL    $SRTUF          ; SORT THE UDBSF
```

```
                        RETURN

                ;+
                ; **-RDBSF-READ THE SPECIFIED BSF FILE
                ;
                ; READ THE BSF (EITHER MDBSF OR UDBSF) SPECIFIED IN R5
                ;  (ROUTINE USED BY '$RDBSF')
                ;
                ; INPUTS:
                ;       R5 = BUFFER ADDRESS
                ;       $LBNL,$LBNH LOADED WITH THE TRANSFER LBN
                ;
                ; OUTPUTS:
                ;       CC      IF TRANSFER WAS NOT SUCESSFUL
                ;-

000000G RDBSF:  MOV     #512.,$XFRSZ    ; SET SIZE OF ONE SECTOR (BYTES)
000000C         MOV     #IO.RLB!IQ.X.R3 ; SET READ FUNCTION (WITHOUT RETRIES)
000000G         CALL    $DSKIO          ; READ 1 BLOCK FROM THE BSF
                RETURN                  ;

                ;+
                ; **-VYBSF-VERIFY THE BSF COPY
                ;  (ROUTINE USED BY '$RDBSF')
                ;
                ; VERIFY THE BSF COPY SPECIFIED BY THE INPUT PARAMETERS
                ;
                ; CALL: JSR     R5,VYBSF
                ;       BSF POINTER
                ;       POINTER TO 'XXBSF SERIAL NUMBER DOESN'T MATCH' MSG
                ;       POINTER TO 'XXBSF COPY CORRUPT' MSG
                ;
                ; OUTPUTS:
                ;       R0 = SPECIFIC ERROR MESSAGE POINTER
                ;       CC      0 IF BSF NOT CORRUPT
                ;       CS      1 IF BSF CORRUPT
                ;-

VYBSF:  MOV     (R5)+,R3        ; GET THE BUFFER POINTER
        MOV     (R5)+,R0        ; BAD S/N MESSAGE POINTER
000000G TSTB    $SWLST          ; LISTING THE MDBSF ?
        BNE     1$              ; IF NE, YES
000000G CMP     (R3),$SNAME     ; VERIFY THE SERIAL NUMBER
        BNE     4$              ; IF NE, FIRST S/N WORD NOT CORRECT
000002  000002G CMP     2(R3),$SNAME+2  ; CHECK THE SECOND WORD
        BNE     4$              ; IF NE, SERIAL NUMBER DOESN'T MATCH
        BR      2$              ; CHECK THE ALIGNMENT FLAG
1$:     TST     (R3)            ; IS SERIAL NUMBER NON-ZERO?
        BNE     2$              ; IF NE YES
000002  TST     2(R3)           ; MAYBE?
        BEQ     3$              ; IF EQ, NO
000006  2$:     TST     6(R3)   ; TEST THE ALIGNMENT DISK FLAG
        BEQ     4$              ; IF EQ, BSF OK
3$:     MOV     (R5)+,R0        ; CORRUPT BSF MESSAGE POINTER
        SEC                     ; SET THE ERROR INDICATOR
        BR      5$              ;
4$:     TST     (R5)+           ; CORRECT THE RETURN
```

```
                                        CLC                     ; SET THE GOOD INDICATOR
                                5$:     RTS     R5              ; RETURN

                                ;+
                                ; **-$WTBSF-WRITE THE MANUFACTURER'S AND USER'S BAD SECTOR FILES
                                ;
                                ; THIS ROUTINE WILL WRITE THE 16 BIT MDBSF AND THE UDBSF ON THE
                                ;  PRIMARY DEC STD 144 TRACK (558,13) AND ON THE ALTERNATE TRACK
                                ;  (559,1).
                                ;
                                ; INPUTS:
                                ;       NONE.
                                ;
                                ; OUTPUTS:
                                ;       NONE.
                                ;-

                                $WTBSF::CALL    $SRTMF          ; SORT THE MDBSF
                                        CALL    $SRTUF          ; SORT THE UDBSF
                                        MOV     #$LOGDV,R3      ; LOGICAL DEVICE ADDRESS POINTER
                                        CALL    $UPDMX          ; UPDATE THE ADDRESS VALUES
                                        MOV     #512.,$XFRSZ    ; SET ONE BLOCK BYTE COUNT
                                        MOV     $MXLBN,$LBNH    ; SETUP LBN
                                        MOV     $MXLBN+2,$LBNL  ; ...

                                ; WRITE THE 16 BIT MDBSF

                                        MOV     #$MDBSF,R5      ; SET MDBSF ADDRESS
                                        MOV     $MBSSZ,R1       ; GET NUMBER OF BLOCKS IN MDBSF
                                        ASR     R1              ; DIVIDE BY TWO
                                        MOV     #IO.WLT!IQ.X,R3 ; SET WRITE LAST TRACK FUNCTION CODE
                                        CALL    1$              ; WRITE THE MDBSF

                                ; WRITE THE 16 BIT UDBSF

                                        MOV     #$UDBSF,R5      ; UDBSF ADDRESS
                                        MOV     $UBSSZ,R1       ; GET NUMBER OF BLOCKS IN UDBSF
                                        ASR     R1              ; DIVIDE BY TWO
                                        MOV     #IO.WLT!IQ.X,R3 ; SET WRITE LAST TRACK FUNCTION CODE
                                        CALL    1$              ; WRITE THE UDBSF

                                ; WRITE THE ALTERNATE DEC STD 144 TRACK (559,1)

                                        MOV     #$PHYDV,R3      ; CHANGE TO PHYSICAL ADDRESSING
                                        CALL    $UPDMX          ; UPDATE THE MAX VALUES
                                        MOV     $ALFLB,$LBNH    ; ALTERNATE DEC STD 144 ADDRESS
                                        MOV     $ALFLB+2,$LBNL  ;

                                ; WRITE THE ALTERNATE MDBSF

                                        MOV     #$MDBSF,R5      ; SET MDBSF ADDRESS
                                        MOV     $MBSSZ,R1       ; NUMBER OF BLOCKS IN THE MDBSF
                                        ASR     R1              ; DIVIDE BY TWO
                                        MOV     #IO.FEW!IQ.UMD,R3       ;SET WRITE FE CYLINDER FUNCTION
                                        CALL    1$              ;

                                ; WRITE THE ALTERNATE UDBSF
```

```
                                                ;+
                                                ; **-$RDSSF-READ RM80 SKIP SECTOR FILE
                                                ;
                                                ; THIS ROUTINE WILL READ THE SKIP SECTOR FILE FOUND ON THE FIRST TRACK
                                                ; OF THE FE CYLINDER AREA ON THE RM80.
                                                ;
                                                ; INPUTS:
                                                ;       $SSFLB = DISK ADDRESS OF START OF SKIPPED SECTOR FILE
                                                ;
                                                ; OUTPUTS:
                                                ;       A GOOD COPY OF THE SSF IS READ INTO SSF BUFFER
                                                ;
                                                ;-

001452  012703  000000G         $RDSSF::MOV     #$PHYDV,R3      ; PHYSICAL DEVICE ADDRESS POINTER
001456  004767  176732                  CALL    $UPDMX          ; UPDATE THE ADDRESS VALUES
001462  012767  000000C 000000G        MOV     #512.*<$SSFLN>,$XFRSZ   ; SET SIZE OF ONE COPY OF SSF (BYTES)
001470  016767  000000G 000000G        MOV     $SSFLB,$LBNH    ; SET DISK ADDRESS OF SSF
001476  016767  000002G 000000G        MOV     $SSFLB+2,$LBNL  ;
001504  016701  000000G                MOV     $SSFSZ,R1       ; GET NUMBER OF COPIES OF SKIP SECTOR FILE
001510  010146                        MOV     R1,-(SP)        ; SAVE THE COPY COUNT
001512  000405                        BR      2$              ; CONTINUE
001514  062767  000000G 000000G 1$:   ADD     #$SSFLN,$LBNL   ; TRY NEXT USABLE SSF COPY
001522  105567  000000G               ADCB    $LBNH           ;
001526  012705  000000G         2$:   MOV     #$SSF,R5        ; GET ADDRESS OF SKIP SECTOR FILE BUFFER
001532  012703  000000C                MOV     #IO.FER!IQ.UMD,R3       ; SET READ FE CYLINDER FUNCTION
001536  004767  000000G                CALL    $DSKIO          ; READ 1 COPY OF SSF
001542  103017                        BCC     5$              ; IF CC, OK
001544  012700  000000G                MOV     #$MSG58,R0      ; CAN'T READ SSF
001550  012601                 3$:    MOV     (SP)+,R1        ; GET THE SSF COPY COUNTER
001552  005301                        DEC     R1              ; DECREMENT THE COPY COUNTER
001554  001006                        BNE     4$              ; IF NE, TRY AGAIN
001556  004767  000000G                CALL    $PRINT          ; PRINT THE ERROR MESSAGE
001562  012700  000000G                MOV     #$MSG41,R0      ; UNABLE TO RECOVER SSF
001566  000167  000000G                JMP     $MSGWR          ; EXIT, CAN'T READ SSF OR SSF CORRUPT
001572  010146                 4$:    MOV     R1,-(SP)        ; SAVE R1
001574  004767  000000G                CALL    $PRINT          ; PRINT THE MESSAGE
001600  000745                        BR      1$              ; TRY AGAIN
001602  012700  000000G         5$:   MOV     #$SSF,R0        ; START WITH HEADER
001606  012701  177777G                MOV     #$SSFHD-1,R1    ; AND ITS LENGTH
001612  004767  176556                CALL    SSFCRC          ; COMPUTE HEADER CHECKSUM
```

```
                                        CMP     R1,(R0)+        ; CHECK THE CHECKSUM WORD
                                        BNE     6$              ; IF NE, BAD CHECKSUM
                                        MOV     #$SSFDT-1,R1    ; DATA FIELD LENGTH
                                        CALL    SSFCRC          ; COMPUTE CHECKSUM OVER DATA AREA
                                        CMP     R1,(R0)         ; CHECKSUM OK?
                                        BNE     6$              ; IF NE, NO
                                        TST     $SSF+4          ; CREATION DATE PRESENT
                                        BEQ     6$              ; IF EQ, NO
                                        TST     $SSF+6          ; REVISION DATE PRESENT
                                        BEQ     6$              ; IF EQ, NO
                                        CMPB    #1,$SSF+12      ; 16 BIT MODE SSF ?
                                        BEQ     7$              ; IF EQ, YES
                                6$:     MOV     #$MSG59,R0      ; SSF CORRUPT
                                        BR      3$              ; TRY AGAIN
                                7$:     TST     (SP)+           ; CORRECT THE STACK
                                        TSTB    $SWLST          ; LISTING THE BSF'S ?
                                        BNE     10$             ; IF NE, YES
                                        TSTB    $SWMOD          ; MODIFYING THE BSF'S
                                        BNE     8$              ; IF NE, YES
                                        MOV     $SSF,$SNAME     ; COPY THE SERIAL NUMBER
                                        MOV     $SSF+2,$SNAME+2 ;
                                        BR      10$             ;
                                8$:     CMP     $SSF,$SNAME     ; CHECK THE SERIAL NUMBER
                                        BNE     9$              ; IF NE, DOESN'T MATCH
                                        CMP     $SSF+2,$SNAME+2 ; CHECK THE SECOND S/N WORD
                                        BEQ     10$             ; IF EQ, S/N OK
                                9$:     MOV     #MSGER8,R0      ; HDA AND ENTERED SERIAL NUMBER DON'T MATCH
                                        JMP     $MSGWR          ; EXIT
                                10$:    JMP     $SRTSF          ; SORT THE SSF AND RETURN

                                ;+
                                ; **-$WTSSF-WRITE RM80 SKIP SECTOR FILE
                                ;
                                ; THIS ROUTINE WILL WRITE THE SKIP SECTOR FILE FIVE TIMES ON THE FIRST
                                ;  TRACK OF THE FE CYLINDER AREA OF THE RM80 (559,0).
                                ;
                                ; INPUTS:
                                ;       $SSFLB = DISK ADDRESS OF START OF SKIP SECTOR FILE
                                ;
                                ; OUTPUTS:
                                ;       WRITE SKIP SECTOR FILE
                                ;
                                ;-

                        $WTSSF::CALL    $SRTSF          ; SORT THE SSF
                                MOV     #$PHYDV,R3      ; PHYSICAL DEVICE ADDRESS POINDER
                                CALL    $UPDMX          ; UPDATE THE ADDRESS VALUES
                                MOV     #$SSF,R0        ;GET POINTER TO SKIP SECTOR FILE
                                MOV     #$SSFHD-1,R1    ;GET LENGTH OF HEADER
                                CALL    SSFCRC          ; COMPUTE HEADER CHECKSUM
                                MOV     R1,(R0)+        ;STORE CRC AWAY
                                MOV     #$SSFDT-1,R1    ;GET LENGTH OF SSF DATA AREA
                                CALL    SSFCRC          ;GO COMPUTE CHECKSUM OVER DATA
                                MOV     R1,(R0)         ;STORE THE DATA FIELD CRC
                                MOV     #512.*<$SSFLN>,$XFRSZ   ;SET SIZE OF ONE COPY OF SSF (BYTES)
                                MOV     #$SSF,R5        ;SET SKIP SECTOR FILE BUFFER ADDRESS
                                MOV     #IO.FEW!IQ.UMD,R5       ;SET WRITE FE CYLINDER FUNCTION
```

```
                                        MOV     $SSFLB,$LBNH    ;SETUP LBN
                                        MOV     $SSFLB+2,$LBNL  ;...
                                        MOV     $SSFSZ,R1       ; GET NUMBER OF COPIES OF SKIP SECTOR FILE
                                1$:     CALL    $DSKIO          ; WRITE THE SSF
                                        ADD     #$SSFLN,$LBNL   ; UPDATE BLOCK NUMBER
                                        ADCB    $LBNH           ; ...
                                        DEC     R1              ; FINISHED ?
                                        BNE     1$              ; IF NE, NO
                                2$:     RETURN                  ;

                                ;+
                                ; **-$SRTRK-SEARCH BSF OR SSF FOR ANY SECTOR ON A TRACK
                                ;
                                ; THIS ROUTINE WILL SEARCH EITHER THE BSF OR THE SSF FOR ANY SECTOR
                                ; ON THE CURRENT TRACK AND CYLINDER.  IF ONE IS FOUND, THEN NO ADDITIONAL
                                ; SECTORS MAY BE SKIPPED ON THE CURRENT TRACK AND CYLINDER.
                                ;
                                ; INPUTS:
                                ;       R1 =    ADDRESS OF EITHER BSF OR SSF
                                ;       R2 =    MAXIMUM ADDRESS OF THE FILE SPECIFIED IN R1
                                ;
                                ; OUTPUTS:
                                ;       CC =    SOME SECTOR ON THE CURRENT TRACK AND CYLINDER
                                ;               R1 =    ADDRESS OF BSF OR SSF ENTRY
                                ;       CS =    SPECIFIED FILE EXHAUSTED
                                ;               R1 =    POINTS TO NEXT ENTRY
                                ;
                                ;-

                                $SRTRK::CMP     (R1)+,(R1)+     ; POINT OT NEXT ENTRY IN SPECIFIED FILE
                                        CMP     (R1),#-1        ; FILE EXHAUSTED
                                        BEQ     3$              ; IF EQ, YES
                                        CMP     (R1),$CYL       ; CYLINDER NUMBER MATCH ?
                                        BNE     2$              ; IF NE, NO
                                        CMPB    3(R1),$TRK      ; TRACK NUMBERS MATCH ?
                                        BNE     2$              ; IF NE, NO
                                1$:     CLC                     ; SHOW ENTRY WAS FOUND
                                        RETURN                  ;
                                2$:     CMP     R1,R2           ; IS SPECIFIED FILE EXHAUSTED ?
                                        BNE     $SRTRK          ; IF NE, NO
                                3$:     SEC                     ; SHOW SPECIFIED FILE EXHAUSTED
                                        RETURN

                                ;+
                                ; **-$SRALL-SEARCH ALL THE BAD SECTOR FILES
                                ;    $SRFES-SEARCH THE FE CYLINDER BUFFER
                                ;    $SRMDF-SEARCH MANUFACTURER'S BAD SECTOR FILE
                                ;    $SRUDF-SEARCH THE USER'S BAD SECTOR FILE
                                ;    $SRSDF-SEARCH THE SKIPPED SECTOR FILE
                                ;    $SMBSF-SEARCH THE FILE SPECIFIED BY R1 & R2
                                ;
                                ; THIS ROUTINE WILL SEARCH THE SPECIFIED FILE FOR A MATCH.
                                ;
                                ; INPUTS:
                                ;       $SEC, $TRK, AND $CYL PRESET
                                ;
                                ; '$SMBSF' INPUTS:
```

```
                                ;       R1 = ADDRESS OF LAST BSF ENTRY (INITIALLY $BSF+4)
                                ;       R2 = LAST ADDRESS OF SPECIFIED FILE
                                ;
                                ; OUTPUTS:
                                ;       IF CC   R1 = ADDRESS OF MDBSF ENTRY.
                                ;               R3 = ISOLATED BAD SECTOR FLAGS.
                                ;       IF CS   R1 = POINTS TO NEXT ENTRY (FILE EXHAUSTED)
                                ;-
                                .ENABL   LSB

002150  016746  000000G         $SRALL::MOV     $SEC,-(SP)      ; SAVE THE SECTOR ADDRESS
002154  004767  000100                  CALL    $SRSDF          ; SEE IF ENTRY IN THE SSF
002160  103015                         BCC     2$              ; IF CC, IT IS
002162  004767  000154                  CALL    $SRSSF          ; SEE IF ERROR SECTOR IS WITHIN A SKIP REGION
002166  103402                         BCS     1$              ; IF CS, NO
002170  105367  000000G                DECB    $SEC            ; DECREMENT THE SECTOR ADDRESS
002174  004767  000034         1$:     CALL    $SRMDF          ; SEARCH THE MDBSF
002200  103005                         BCC     2$              ; IF CC, ADDRESS PRESENT
002202  004767  000040                  CALL    $SRUDF          ; SEARCH THE UDBSF
002206  103002                         BCC     2$              ; IF CC, ADDRESS PRESENT
002210  004767  000006                  CALL    $SRFES          ; SEE IF ENTRY DUPLICATED IN THE FE AREA
002214  012667  000000G        2$:     MOV     (SP)+,$SEC      ; RESTORE THE SECTOR ADDRESS
002220  000207                         RETURN                  ;

002222  012701  177774G         $SRFES::MOV     #$FEBSF-4,R1    ; FEBSF STARTING ADDRESS
002226  012702  000100G                 MOV     #$FEBSF+64.,R2  ; FEBSF LENGTH
002232  000416                         BR      3$              ;

002234  012701  000004G         $SRMDF::MOV     #$MDBSF+4,R1    ; MDBSF STARTING ADDRESS
002240  012702  000774G                 MOV     #$MDBSF+1000-4,R2       ; MDBSF LENGTH
002244  000411                         BR      3$              ;

002246  012701  000004G         $SRUDF::MOV     #$UDBSF+4,R1    ; UDBSF STARTING ADDRESS
002252  012702  000774G                 MOV     #$UDBSF+1000-4,R2       ; UDBSF LENGTH
002256  000404                         BR      3$              ;

002260  012701  000000C         $SRSDF::MOV     #$SSF+<2*$SSFHD>-4,R1   ; SSF STARTING ADDRESS (-4)
002264  012702  000000C                 MOV     #$SSF+<1000*$SSFLN>-2,R2        ; SSF ENDING ADDRESS
002270                          3$:

002270  022121                  $SMBSF::CMP     (R1)+,(R1)+     ; POINT TO NEXT MDBSF ENTRY
002272  021127  177777                  CMP     (R1),#-1        ; MDBSF EXHAUSTED?
002276  001417                         BEQ     5$              ; IF EQ YES
002300  021167  000000G                 CMP     (R1),$CYL       ; CYLINDER NUMBERS MATCH?
002304  001012                         BNE     4$              ; IF NE NO
002306  126167  000003  000000G        CMPB    3(R1),$TRK      ; TRACK NUMBERS MATCH?
002314  001006                         BNE     4$              ; IF NE NO
002316  126167  000002  000000G        CMPB    2(R1),$SEC      ; SECTOR NUMBERS MATCH?
002324  001002                         BNE     4$              ; IF NE NO
002326  000241                         CLC                     ; SHOW ENTRY WAS FOUND
002330  000207                         RETURN                  ;
002332  020102                  4$:     CMP     R1,R2           ; IS SPECIFIED FILE EXHAUSTED?
002334  001355                         BNE     3$              ; IF NE, NO
002336  000261                  5$:     SEC                     ; SHOW MDBSF EXHAUSTED
002340  000207                         RETURN                  ;
                                .DSABL   LSB
```

```
                        ;+
                        ; **-$SRSSF-SEARCH SSF FOR AN TRACK ENTRY
                        ;
                        ; THIS ROUTINE WILL SEARCH THE SSF FOR AN ENTRY ON THE CURRENT TRACK AND
                        ; CYLINDER.  IF AN ENTRY IS FOUND WHICH IS LESS THAN THE SECTOR ADDRESS
                        ; IN '$SEC', THE ROUTINE WILL RETURN WITH THE 'C' BIT CLEAR.
                        ;
                        ; INPUTS:
                        ;       $CYL LOADED WITH THE CYLINDER ADDRESS
                        ;       $TRK LOADED WITH THE TRACK ADDRESS
                        ;       $SEC LOADED WITH THE SECTOR ADDRESS
                        ;
                        ; OUTPUTS:
                        ;       CC =    SSF ENTRY .LE. ADDRESS IN $CYL,$TRK,$SEC
                        ;       CS =    NO SSF ENTRY .LE. ADDRESS IN $CYL,$TRK,$SEC
                        ;-
002342  010146          $SRSSF::MOV     R1,-(SP)        ; SAVE R1
002344  012701  000000C         MOV     #$SSF+<2*$SSFHD>,R1     ; BEGINNING ADDRESS OF SSF DATA
002350  021167  000000G 1$:     CMP     (R1),$CYL       ; CYLINDER NUMBERS MATCH
002354  001012                  BNE     2$              ; IF NE, NO
002356  126167  000003  000000G       CMPB    3(R1),$TRK      ; TRACK NUMBERS MATCH ?
002364  001006                  BNE     2$              ; IF NE, NO
002366  126167  000002  000000G       CMPB    2(R1),$SEC      ; CHECK FOR A SECTOR
002374  101011                  BHI     3$              ; IF HI, SSF ENTRY HIGHER THAN $SEC
002376  000241                  CLC                     ; SHOW ENTRY WAS FOUND
002400  000410                  BR      4$              ;
002402  020127  000000C 2$:     CMP     R1,#$SSF+<1000*$SSFLN>-2        ; SSF BUFFER END ?
002406  001404                  BEQ     3$              ; IF EQ, YES
002410  022121                  CMP     (R1)+,(R1)+     ; INCREMENT BUFFER POINTER
002412  021127  177777          CMP     (R1),#-1        ; SEE IF END OF DATA
002416  001354                  BNE     1$              ; IF NE, NO
002420  000261          3$:     SEC                     ; SHOW '$SEC' NOT IN SKIP REGION
002422  012601          4$:     MOV     (SP)+,R1        ; RESTORE R1
002424  000207                  RETURN

                        ;+
                        ; **-$SRTSF-SORT THE SSF BUFFER
                        ;
                        ; INPUTS:
                        ;       NONE
                        ;
                        ; OUTPUTS:
                        ;       SSF FILE SORTED IN ASCENDING SEQUENCE
                        ;
                        ;-

002426  012767  001061  000000G $SRTSF::MOV     #561.,$CYL      ; LOAD A PHONY CYLINDER ADDRESS
002434  005067  000000G         CLR     $TRK            ; CLEAR THE TRACK ADDRESS
002440  005067  000000G         CLR     $SEC            ;       ''      ''  SECTOR    ''
002444  004767  177610          CALL    $SRSDF          ; FIND THE END OF THE DATA
002450  010103                  MOV     R1,R3           ; COPY THE END OF DATA POINTER
002452  012701  000000C         MOV     #$SSF+<2*$SSFHD>,R1     ; SSF STARTING ADDRESS
002456  000167  000070          JMP     $SORT           ; SORT THE SSF

                        ;+
```

```
                                ;**-$SRTMF-SORT THE MDBSF BUFFER
                                ;
                                ;INPUTS:
                                ;       NONE
                                ;
                                ;OUTPUTS:
                                ;       MDBSF SORTED IN ASCENDING SEQUENCE
                                ;
                                ;-
002462  012767  001061  000000G $SRTMF::MOV     #561.,$CYL      ;LOAD A PHONY CYLINDER ADDRESS
002470  005067  000000G                CLR     $TRK            ;CLEAR THE TRACK ADDRESS
002474  005067  000000G                CLR     $SEC            ;  "     "  SECTOR   "
002500  004767  177530                CALL    $SRMDF          ;SEARCH THE MDBSF
002504  010103                        MOV     R1,R3           ;COPY THE END OF DATA POINTER
002506  012701  000010G                MOV     #$MDBSF+10,R1   ;MDBSF STARTING ADDRESS
002512  000167  000034                JMP     $SORT           ;SORT THE MDBSF

                                ;+
                                ;**-$SRTUF-SORT THE UDBSF BUFFER
                                ;
                                ;INPUTS:
                                ;       NONE
                                ;
                                ;OUTPUTS:
                                ;       UDBSF SORTED IN ASCENDING SEQUENCE
                                ;
                                ;-
002516  012767  001061  000000G $SRTUF::MOV     #561.,$CYL      ;LOAD A PHONY CYLINDER ADDRESS
002524  005067  000000G                CLR     $TRK            ;CLEAR THE TRACK ADDRESS
002530  005067  000000G                CLR     $SEC            ;  "     "  SECTOR   "
002534  004767  177506                CALL    $SRUDF          ;SEARCH THE UDBSF
002540  010103                        MOV     R1,R3           ;COPY THE END OF DATA POINTER
002542  012701  000010G                MOV     #$UDBSF+10,R1   ;UDBSF STARTING ADDRESS
002546  000167  000000                JMP     $SORT           ;SORT THE UMDBSF

                                ;+
                                ;**-$SORT-SORT THE INPUT TABLE
                                ;THIS ROUTINE SORTS THE INPUT TABLE IN ASCENDING ORDER
                                ;BASED ON DISK ADDRESSES.
                                ;
                                ;INPUTS:
                                ;       R1 = TABLE START ADDRESS
                                ;       R3 = TABLE UPPER LIMIT ADDRESS
                                ;
                                ;OUTPUTS:
                                ;       SORTED TABLE
                                ;
                                ;-

002552  010302                $SORT:  MOV     R3,R2           ;R2 = CURRENT ENTRY POINTER
002554  160102                        SUB     R1,R2           ;TEST FOR AT LEAST
002556  022702  000004                CMP     #4,R2           ;TWO ENTRIES IN TABLE
002562  103042                        BHIS    4$              ;IF NOT(HIS), NO NEED TO SORT
002564  010102                        MOV     R1,R2           ;INIT R2
```

```
                                                CMP     (R2)+,(R2)+     ;
                                                MOV     R3,TEMP         ; FORM AND SAVE
                                                SUB     #4,TEMP         ; UPPER LIMIT ON R1
                                        1$:     CMP     (R1),(R2)       ; CYL I = CYL I+1?
                                                BLT     3$              ; IF LT  YES
                                                BNE     2$              ; IF NE  CYL I > CYL I+1
                                                CMP     2(R1),2(R2)     ; CYL I = CYL I+1...TEST TRK/SEC
                                                BLE     3$              ; IF LE  NO SWAP NECESSARY
                                        2$:     MOV     (R1),-(SP)      ; SWAP ENTRIES
                                                MOV     2(R1),-(SP)     ;     .
                                                MOV     (R2),(R1)       ;     .
                                                MOV     2(R2),2(R1)     ;     .
                                                MOV     (SP)+,2(R2)     ;     .
                                                MOV     (SP)+,(R2)      ;     .
                                        3$:     CMP     (R2)+,(R2)+     ; UPDATE R2
                                                CMP     R2,R3           ; THIS PASS DONE?
                                                BLT     1$              ; IF LT  NO
                                                CMP     (R1)+,(R1)+     ; UPDATE R1
                                                CMP     R1,TEMP         ; ALL DONE?
                                                BGE     4$              ; IF GE  YES
                                                MOV     P1,R2           ; RESET R2
                                                CMP     (R2)+,(R2)+     ;
                                                BR      1$              ;
                                        4$:     RETURN                  ;

                                        TEMP:   .WORD   0               ; SORT WORK LOCATION


                                        ;+
                                        ; **-GENHDR-GENERATE HEADER WORD PATTERN
                                        ;
                                        ; THIS SUBROUTINE WILL GENENRATE THE 4-WORD HEADER PATTERN.
                                        ;
                                        ; INPUTS:
                                        ;       R0 = BUFFER ADDRESS
                                        ;
                                        ; OUTPTUS:
                                        ;       R0 = UPDATED BUFFER ADDRESS
                                        ;-

                                        GENHDR::MOV     $CYL,(R0)       ; SET CYLINDER NUMBER
                                                MOVB    $SEC,2(R0)      ; SET SECTOR NUMBER
                                                MOVB    $TRK,3(R0)      ; SET TRACK NUMBER
                                                BIS     #150000,(R0)    ; SET GOOD SECTOR AND 16-BIT FORMAT FLAGS
                                                MOVB    $SEC,-(SP)      ; SAVE THE CURRENT SECTOR ADDRESS
                                                TSTB    SKPFRE          ; LOOK AT THE SKIP SECTOR FLAG
                                                BEQ     1$              ; IF EQ, NO SKIP SECTOR ON THIS TRACK
                                                BIS     #20000,(R0)     ; SET SKIP SECTOR FLAG IN HEADER (BAD)
                                                DECB    $SEC            ; DECREMENT THE SECTOR ADDRESS
                                                BR      2$

                                        ; SEARCH THE SKIP SECTOR FILE FOR A SECTOR ON THIS TRACK THE SAME AS
                                        ; '$SEC'.  IF A SECTOR IS FOUND, THEN SET THE SKIP SECTOR FLAG IN THE
                                        ; REMAINING HEADERS AND NOTE THAT A SKIPPED SECTOR WAS FOUND.

                                        1$:     CALL    $SRSDF          ; SEARCH THE SKIP SECTOR FILE
                                                BCS     2$              ; IF CS NO SECTOR THE SAME
                                                BIS     #20000,(R0)     ; SET SKIP SECTOR FLAG (BAD)
```

```
954 002756  105267  000000G                 INCB    SKPFRE          ; INC SKIPPED SECTOR FLAG
955 002762  000421                          BR      5$              ; EXIT
956
957                                 ; SEARCH THE MDBSF, UDBSF, & THE FE BSF BUFFER FOR A MATCH.  IF ONE IS
958                                 ; FOUND, SET THE BAD SECTOR BITS IN THE APPROPRIATE HEADER.
959
960 002764  004767  177244          2$:     CALL    $SRMDF          ; SEARCH THE MDBSF
961 002770  103403                          BCS     3$              ; IF CS, MDBSF EXHAUSTED
962 002772  042710  100000                  BIC     #100000,(R0)    ; CLEAR THE MF BIT (BAD)
963 002776  000413                          BR      5$
964
965 003000  004767  177242          3$:     CALL    $SRUDF          ; SEARCH THE UDBSF
966 003004  103403                          BCS     4$              ; IF CS, UDBSF EXHAUSTED
967 003006  042710  040000                  BIC     #40000,(R0)     ; CLEAR THE UF BIT (BAD)
968 003012  000405                          BR      5$
969
970 003014  004767  177202          4$:     CALL    $SRFES          ; SEARCH THE FE BSF
971 003020  103402                          BCS     5$              ; IF CS, FE BSF EXHAUSTED
972 003022  042710  140000                  BIC     #140000,(R0)    ; CLEAR BOTH THE UF & MF BITS (BAD)
973 003026  112667  000000G         5$:     MOVB    (SP)+,$SEC      ; RESTORE THE SECTOR ADDRESS
974 003032  066700  000000G                 ADD     SECSZ,R0        ; UPDATE BUFFER ADDRESS
975 003036  000207                          RETURN
976
977         000001                  .END
```

SYMBOL TABLE

```
ERROU1  000050R        $BUFRX= ****** GX      $MSG18= ****** GX      $PRINT= ****** GX      $SRUDF  002246RG
GENHDR  002674RG       $CBDMG= ****** GX      $MSG19= ****** GX      $PRMPT  000250RG       $SSF   = ****** GX
IO.FER= ****** GX      $CBOMG= ****** GX      $MSG21= ****** GX      $PRNTO= ****** GX      $SSFDT= ****** GX
IO.FEW= ****** GX      $CVTDA  000132RG       $MSG26= ****** GX      $RDBSF  000616RG       $SSFHD= ****** GX
IO.HMS= ****** GX      $CYL   = ****** GX     $MSG40= ****** GX      $RDSSF  001452RG       $SSFLB= ****** GX
IO.RLB= ****** GX      $DSKIO= ****** GX      $MSG41= ****** GX      $READ  = ****** GX     $SSFLN= ****** GX
IO.WLT= ****** GX      $DVICE= ****** GX      $MSG42= ****** GX      $SEC   = ****** GX     $SSFSZ= ****** GX
IO.UMD= ****** GX      $DVUNT= ****** GX      $MSG43= ****** GX      $SMBSF  002270RG       $SWLST= ****** GX
IO.X   = ****** GX     $EROCT  000074RG       $MSG44= ****** GX      $SNAME= ****** GX      $SWMOD= ****** GX
MSG     000336R        $EROUT  000032RG       $MSG58= ****** GX      $SORT   002552R        $TRK   = ****** GX
MSGER8= ****** GX      $FEBSF= ****** GX      $MSG59= ****** GX      $SRALL  002150RG       $TSTDA  000454RG
RDBSF   001116R        $HOMSK  000204RG       $MULT   000342RG       $SRFES  002222RG       $TSTMX  000512RG
SECSZ  = ****** GX     $IOST  = ****** GX     $MVPAT  000000RG       $SRMDF  002234RG       $UBSSZ= ****** GX
SKPFRE= ****** GX      $LBNH  = ****** GX     $MXCYL= ****** GX      $SRSDF  002260RG       $UDBSF= ****** GX
SSFCRC  000374R        $LBNL  = ****** GX     $MXLBN= ****** GX      $SRSSF  002342RG       $UNTID  000562RG
TEMP    002672R        $LOGDV= ****** GX      $MXSEC= ****** GX      $SRTMF  002462RG       $UPDMX  000414RG
TRKSZ  = ****** GX     $MBSSZ= ****** GX      $MXTRK= ****** GX      $SRTRK  002106RG       $WTBSF  001224RG
VYBSF   001136R        $MDBSF= ****** GX      $PAT   = ****** GX     $SRTSF  002426RG       $WTSSF  001760RG
$ALFLB= ****** GX      $MOVE   000240RG       $PHYDV= ****** GX      $SRTUF  002516RG       $XFRSZ= ****** GX
$BUF   = ****** GX     $MSGWR= ****** GX

. ABS.  000000      000
        003040      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  908 WORDS  ( 4 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:32
[300,20]FMTSUB,[300,30]FMTSUB=[300,10]FMTSUB
```

```
                        .TITLE  FMTPRS - GET AND PARSE COMMAND LINE
                        .IDENT  /01.00/
                        ;
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                        ;
                        ; VERSION 01.00
                        ;
                        ; C. HESS       14-AUG-80
                        ; M. LEAVITT    14-OCT-80
                        ;
                        .MCALL  DIR$, ISTAT$, STATE$, TRAN$
                        .MCALL  DEVDF$
 000000                         DEVDF$
```

```
                        ;+
                        ; **-$PARSE-PARSE COMMAND LINE
                        ;
                        ; THIS ROUTINE WILL GET THE COMMAND LINE AND PARSE THE
                        ; DEVICE NAME AND SWITCHES.
                        ;
                        ; INPUTS:
                        ;       NONE.
                        ;
                        ; OUTPUTS:
                        ;       R1 = DEVICE UNIT NUMBER
                        ;       EXIT IS TO '$MESAG' IF ERROR.
                        ;       EXIT IS TO '$FMTEX' COMMAND LINE TERMINATED WITH 'EOF'.
                        ;-

000000  005227  177777         $PARSE::INC     #-1             ; FIRST TIME THRU HERE ?
000004  001404                         BEQ     1$              ; BR IF YES
000006  012700  000000G                MOV     #$STARS,R0      ; GET ADDRESS OF MESSAGE
000012  004767  000000G                CALL    $PRINT          ; PRINT '**********'<CR><LF>
000016  012700  000000G         1$:    MOV     #$MSG70,R0      ; GET PROMPT MESSAGE ADDRESS
000022  004767  000000G                CALL    $PRMPT          ; PROMPT USER AND GET RESPONSE
000026  001006                         BNE     2$              ; IF NE COMMAND LINE ENTERED
000030  122767  000000C 000000G        CMPB    #IE.EOF&377,$IOST       ; END OF INPUT?
000036  001367                         BNE     1$              ; IF NE NO
000040  000167  000C00G                JMP     $FMTEX          ; EXIT GRACEFULLY

                        ; SETUP TO CALL THE PARSER

000044  005001          2$:    CLR     R1              ; CLEAR OPTIONS WORD
000046  012702  000000'                MOV     #UNTKT1,R2      ; GET KEYWORD TABLE ADDRESS
000052  012704  000000G                MOV     #$BUFRX,R4      ; GET ADDRESS OF COMMAND LINE
000056  012705  000000'                MOV     #UNIT,R5        ; GET STARTING STATE ADDRESS
000062  012767  177777  C00000G       MOV     #-1,$DVUNT      ; RESET DEVICE NUMBER
000070  004767  000000G                CALL    .TPARS          ; GO PARSE THE INPUT LINE
000074  103435                         BCS     SYNTAX          ; IF CS SYNTAX ERROR
000076  005767  000000G                TST     $DVUNT          ; NULL PARSE?
000102  100745                         BMI     1$              ; IF MI, YES
000104  012700  000000G         3$:    MOV     #$MSG71,R0      ; GET PROMPT MESSAGE ADDRESS
000110  004767  000000G                CALL    $PRMPT          ; PROMPT USER AND GET RESPONSE
000114  001006                         BNE     4$              ; IF NE COMMAND LINE ENTERED
000116  122767  000000C 000000G        CMPB    #IE.EOF&377,$IOST       ; END OF INPUT?
000124  001002                         BNE     4$              ; IF NE NO
000126  000167  000000G                JMP     $FMTEX          ; EXIT GRACEFULLY
000132  005001          4$:    CLR     R1              ; CLEAR OPTIONS WORD
000134  012702  000000'                MOV     #OPTKT2,R2      ; GET KEYWORD TABLE ADDRESS
000140  012704  000000G                MOV     #$BUFRX,R4      ; GET ADDRESS OF COMMAND LINE
000144  012705  000010'                MOV     #OPTION,R5      ; GET STARTING STATE ADDRESS
000150  004767  000000G                CALL    .TPARS          ; GO PARSE THE INPUT LINE
000154  103405                         BCS     SYNTAX          ; IF CS SYNTAX ERROR
000156  004767  000134                CALL    $TSTDV          ; MAKE A FINAL DEVICE TEST
000162  016701  000000G                MOV     $DVUNT,R1       ; SET SPECIFIED UNIT NUMBER
000166  000207                         RETURN                  ; ALL IS OK

000170  012700  000000G         SYNTAX: MOV     #$MSG2,R0       ; SYNTAX ERROR
000174  000167  000000G                JMP     $MSGWR          ; EXIT WITH WARNING STATUS
```

```
                        ;+
                        ; STATE TABLE FOR 'TPARS' PARSER
                        ;-

                        .NLIST  MEB

000200                          ISTAT$  UNTST1,UNTKT1

                        ; READ DEVICE AND UNIT NUMBER

000200                          STATE$  UNIT
000200                          TRAN$   $EOS,$EXIT
000200                          TRAN$   $NUMBR,,$STUNT

000200                          STATE$                  ; TERMINATING STATE


000200                          ISTAT$  OPTST2,OPTKT2

                        ; PROCESS SWITCH OPTIONS

000200                          STATE$  OPTION
000200                          TRAN$   $EOS,$EXIT
000200                          TRAN$   "CSR",CSR
000200                          TRAN$   "VEC",VEC
000200                          TRAN$   "VFL",VFL
000200                          TRAN$   "ERL",ERL
000200                          TRAN$   "LI",LI
000200                          TRAN$   "FO",FO
000200                          TRAN$   "IN",IN

                        ; SET NEW CSR ADDRESS

000200                          STATE$  CSR
000200                          TRAN$   '=

000200                          STATE$
000200                          TRAN$   $NUMBR,SWITCH,$STCSR

                        ; SET NEW VECTOR ADDRESS

000200                          STATE$  VEC
000200                          TRAN$   '=

000200                          STATE$
000200                          TRAN$   $NUMBR,SWITCH,$STVEC

                        ; SET VERIFY LIMIT (NUMBER OF TIMES TO VERIFY A SECTOR)

000200                          STATE$  VFL
000200                          TRAN$   '=

000200                          STATE$
000200                          TRAN$   $DNUMB,SWITCH,$STVFL

                        ; SET ERROR LIMIT

```

```
                                        STATE$  ERL
                                        TRAN$   '=

                                        STATE$
                                        TRAN$   $DNUMB,SWITCH,$STERL

                                ; SET BAD BLOCK FILE/SKIP SECTOR FILE LIST

                                        STATE$  LI
                                        TRAN$   ':,LOG
                                        TRAN$   $LAMDA,SWITCH,$STLIS

                                        STATE$  LOG
                                        TRAN$   'L,SWITCH,$STLOG

                                ; SET FORMAT ENABLE

                                        STATE$  FO
                                        TRAN$   ':,FE
                                        TRAN$   $LAMDA,SWITCH,$STFOR

                                        STATE$  FE
                                        TRAN$   'F,SWITCH,$STFFE

                                ; SET BSF/SSF INITIALIZATION

                                        STATE$  IN
                                        TRAN$   $LAMDA,SWITCH,$STIN

                                ; CHECK FOR ANOTHER OPTION

                                        STATE$  SWITCH
                                        TRAN$   $EOS,$EXIT
                                        TRAN$   '/,OPTION

                                        STATE$                  ; NULL (TERMINATING) STATE

                                .ENABL  LSB

                                ;
                                ; DEVICE UNIT NUMBER
                                ;

000200  016767  000000G 000000G $STUNT::MOV     .PNUMB,$DVUNT   ; STORE UNIT NUMBER
000206  026727  000000G 000007          CMP     $DVUNT,#7       ; IS DRIVE NUMBER WITHIN RANGE ?
000214  101402                          BLOS    1$              ; IF LOS, YES
000216  000167  177746                  JMP     SYNTAX          ; SYNTAX ERROR

                                ;
                                ; DETERMINE DEVICE VALIDITY
                                ;

000222  016702  000000G         1$:     MOV     $DEVHD,R2       ; ADDRESS OF 1ST DCB IN SYSTEM
000226  026762  000000G 000004  2$:     CMP     $DVICE,D.NAM(R2); IS THIS THE RIGHT DCB?
000234  001407                          BEQ     4$              ; IF EQ YES
000236  016202  000000                  MOV     D.LNK(R2),R2    ; POINT TO NEXT DCB
000242  001371                          BNE     2$              ; LOOP TILL END OF LIST
```

```
                                        ;
                                        ; TEST DEVICE CHARACTERISTICS
                                        ;

000316  016701  000000G         $TSTDV::MOV     $UCB,R1         ; FETCH UCB ADDRESS
000322  016702  000000G                 MOV     $SCB,R2         ; FETCH SCB ADDRESS
000326  016202  000012                  MOV     S.CSR(R2),R2    ; GET CSR ADDRESS
000332  013746  000004                  MOV     @#4,-(SP)       ; SAVE TRAP VECTOR
000336  012737  000570' 000004          MOV     #INTR,@#4       ; PUT OUR OWN IN ITS PLACE
000344  005712                          TST     (R2)            ; DOES CSR ADDRESS EXIST?
000346  103003                          BCC     5$              ; IF CC YES
000350  012637  000004                  MOV     (SP)+,@#4       ; RESTORE TRAP ADDRESS
000354  000733                          BR      3$              ; PRINT ERROR MESSAGE
000356  012637  000004          5$:     MOV     (SP)+,@#4       ; RESTORE TRAP ADDRESS
000362  012762  000040  000010  6$:     MOV     #40,10(R2)      ; CLEAR THE SUBSYSTEM
000370  116162  000006  000010          MOVB    U.UNIT(R1),10(R2)       ; SELECT UNIT
000376  016200  000026                  MOV     26(R2),R0       ; GET DRIVE TYPE REGISTER
000402  032762  010000  000010          BIT     #10000,10(R2)   ; SEE IF DRIVE PRESENT
000410  001016                          BNE     9$              ; IF NE, NO - 'NED' SET
000412  022700  024026                  CMP     #24026,R0       ; IS IT AN RM80 ?
000416  001403                          BEQ     7$              ; IF EQ, YES
000420  022700  020026                  CMP     #20026,R0       ; CHECK OTHER DEVICE TYPE CODE
000424  001013                          BNE     10$             ; IF NE, NO
000426  032762  010000  000012  7$:     BIT     #10000,12(R2)   ; IS DRIVE ONLINE (MOL SET) ?
000434  001401                          BEQ     8$              ; IF EQ, NO
000436  000207                          RETURN                  ;
000440  012700  000000G         8$:     MOV     #$MSG7,R0       ; DRIVE OFFLINE
000444  000405                          BR      11$             ;
000446  012700  000000G         9$:     MOV     #$MSG72,R0      ; DRIVE NOT PRESENT
000452  000402                          BR      11$             ;
000454  012700  000000G         10$:    MOV     #$MSG73,R0      ; DRIVE NOT AN RM80
000460  000167  000000G         11$:    JMP     $MESAG          ;

                                .DSABL  LSB

                                        ;
                                        ; SET NEW CSR ADDRESS
                                        ;

000464  016702  000000G         $STCSR::MOV     $UCB,R2         ; FETCH UCB ADDRESS
000470  026727  000000G 160000          CMP     .PNUMB,#160000  ; CSR ADDRESS WITHIN RANGE?
000476  103003                          BHIS    1$              ; IF HIS YES
000500  012700  000000G                 MOV     #$MSG2,R0       ; SYNTAX ERROR
000504  000414                          BR      2$              ;
000506  013746  000004          1$:     MOV     @#4,-(SP)       ; SAVE INTERRUPT VECTOR
000512  012737  000570' 000004          MOV     #INTR,@#4       ; SET UP OUR OWN VECTOR
000520  005777  000000G                 TST     @.PNUMB         ; SEE IF IT'S ON THE BUS
```

```
                                        BCC     3$              ; IF CC IT'S THERE
                                        MOV     (SP)+,@#4       ; RESTORE VECTOR
                                        MOV     #$MSG28,R0      ; CSR NOT IN SYSTEM
                                2$:     JMP     $MESAG          ;
                                3$:     BICB    #US.OFL,U.ST2(R2)       ; SET DEVICE ON-LINE
                                        MOV     (SP)+,@#4       ; RESTORE INTERRUPT VECTOR
                                        MOV     $SCB,R2         ; GET SCB ADDRESS
                                        MOV     .PNUMB,S.CSR(R2)        ; SET CSR ADDRESS
                                        RETURN                  ;
                                ;
                                ; INTERRUPTS COME HERE ON NON-EXISTANT MEMORY TRAPS
                                ;
                                INTR:   BIS     #1,2(SP)        ;; SET CARRY BIT IN SAVED PS
                                        RTI                     ;; RETURN

                                ;
                                ; SET NEW VECTOR ADDRESS
                                ;
                                $STVEC: MOV     .PNUMB,R0       ; FETCH NEW VECTOR ADDRESS
                                        CMP     R0,#1000        ; IS THE VECTOR IN A REASONABLE PLACE?
                                        BHIS    2$              ; IF HIS NO GOOD
                                        BIT     #3,R0           ; MULTIPLE OF 4?
                                        BEQ     4$              ; IF EQ YES
                                1$:     MOV     #$MSG27,R0      ; NOT MULTIPLE OF FOUR
                                        BR      3$              ;
                                2$:     MOV     #$MSG2,R0       ; SYNTAX ERROR
                                3$:     JMP     $MESAG          ;
                                4$:     MOV     $SCB,R2         ; PICK UP SCB ADDRESS
                                        MOVB    S.VCT(R2),R2    ; FETCH OLD VECTOR ADDRESS
                                        BIC     #177400,R2      ; THIS IS CHEAPER THAN ANOTHER WAY
                                        ASL     R2              ; COMPUTE ABSOLUTE ADDRESS
                                        ASL     R2              ;
                                        MOV     (R2),$INADD     ; GET RM80 DRIVER ISR ADDRESS
                                        MOV     #$NONSI,(R2)    ; IGNORE INTERRUPT TO OLD VECTOR
                                        MOV     $INADD,(R0)     ; NEW INTERRUPT VECTOR
                                        ASR     R0              ; FORM NEW VECTOR MOD4
                                        ASR     R0              ;
                                        MOV     $SCB,R2         ; GET SCB ADDRESS
                                        MOVB    R0,S.VCT(R2)    ; SET NEW VECTOR ADDRESS
                                        RETURN                  ;

                                ;
                                ; SET VERIFY COUNT
                                ;
                                $STVFL::CMP     #377,..PNUMB    ; LIMIT WITHIN RANGE?
                                        BLO     1$              ; IF LO NO
                                        TST     .PNUMH          ; STILL?
                                        BNE     1$              ; IF NE NO
                                        MOVB    .PNUMB,$VERIF   ; SET VERIFICATION COUNT
                                        RETURN                  ;
                                1$:     JMP     SYNTAX          ; SYNTAX ERROR

                                ;
                                ; SET ERROR LIMIT
                                ;
```

```
                                ;
                                ; SET LIST MODE
                                ;
                                ;
000774  105267  000000G        $STLOG::INCB    $SWLOG          ; SET THE 'LIST LOGICAL' SWITCH
001000  105267  000000G        $STLIS::INCB    $SWLST          ; SET THE 'LIST' SWITCH
001004  000207                  RETURN                          ;
                                ;
                                ; SET ENABLE FORMAT SWITCH
                                ;
001006  105267  000000G        $STFFE::INCB    $SWFFE          ; SET THE 'FORMAT FE' SWITCH
001012  105267  000000G        $STFOR::INCB    $SWFMT          ; SET THE 'FORMAT' SWITCH
001016  000207                  RETURN
                                ;
                                ; SET BSF/SSF INITIALIZATION SWITCH
                                ;
001020  105267  000000G        $STIN:: INCB    $SWINT          ; SET THE 'INITIALIZATION' SWITCH
001024  000207                  RETURN

                        .END
```

SYMBOL TABLE

```
CSR      000050R     002 OPTKT2  000000RG    003 S3.RAL= 000010          U.FNUM= 000036          $DVUNT= ****** GX
DV.CCL= 000002           OPTST2  000010RG    002 S3.RCU= 000400          U.FPS = 000044          $EOS  = 000312
DV.COM= 020000           SPARE = 000010          S3.TAB= 000100          U.KCSR= 000032          $EXIT = 000000
DV.DIR= 000010           SP.EIP= 000001          S3.VER= 010000          U.KCS6= 000034          $FMTEX= ****** GX
DV.F11= 040000           SP.ENB= 000002          S3.WAL= 004000          U.LUIC  177774          $INADD= ****** GX
DV.ISP= 002000           SP.LOG= 000004          S3.WES= 000040          U.OWN   177776          $IOST = ****** GX
DV.MBC= 000400           SWITCH  000156R     002 S3.8BC= 000200          U.RED   000002          $LAMDA= 000300
DV.MNT= 100000           SYNTAX  000170R         UC.ALG= 000200          U.RPS = 000042          $MESAG= ****** GX
DV.MXD= 000100           S.BMSK  177776          UC.ATT= 000010          U.SCB   000020          $MSGWR= ****** GX
DV.OSP= 004000           S.BMSV  177774          UC.KIL= 000004          U.STS   000005          $MSG2 = ****** GX
DV.PSE= 010000           S.CON   000010          UC.LGH= 000003          U.ST2   000007          $MSG27= ****** GX
DV.REC= 000001           S.CSR   000012          UC.NPR= 000100          U.TCHP  000042          $MSG28= ****** GX
DV.SDI= 000020           S.CTM   000006          UC.PWF= 000020          U.TCVP  000043          $MSG4 = ****** GX
DV.SQD= 000040           S.FRK   000016          UC.QUE= 000040          U.TFLK  000040          $MSG7 = ****** GX
DV.SWL= 001000           S.ITM   000007          UNIT    000000R     002 U.TFRQ  000037          $MSG70= ****** GX
DV.TTY= 000004           S.LHD   000000          UNTKT1  000000RG    003 U.TLPP  000036          $MSG71= ****** GX
DV.UMD= 000200           S.PKT   000014          UNTST1  000000RG    002 U.TMTI  000047          $MSG72= ****** GX
D.DSP   000012           S.PRI   000004          US.ABO= 000001          U.TSTA  000026          $MSG73= ****** GX
D.LNK   000000           S.RCNT  177772          US.BSP= 000002          U.TTAB  000034          $NONSI= ****** GX
D.MSK   000014           S.ROFF  177773          US.BSY= 000200          U.TTYP  000046          $NUMBR= 000302
D.NAM   000004           S.STS   000011          US.CRW= 000004          U.TUX   000024          $PARSE  000000RG
D.PCB   000034           S.VCT   000005          US.DSB= 000010          U.UIC   000044          $PRINT= ****** GX
D.UCB   000002           S1.BEL= 000400          US.ECH= 000002          U.UNIT  000006          $PRMPT= ****** GX
D.UCBL  000010           S1.CTO= 000040          US.FOR= 000040          U.VCB = 000034          $RAD50= 000316
D.UNIT  000006           S1.CTS= 010000          US.FRK= 000002          U2.AT.= 000020          $SCB  = ****** GX
D.VCAN= 000002           S1.DEC= 002000          US.KPF= 000001          U2.CRT= 002000          $STARS= ****** GX
D.VDEB= 177776           S1.DPR= 001000          US.LAB= 000004          U2.DH1= 100000          $STCSR  000464RG
D.VINI= 000000           S1.DSI= 004000          US.MDE= 000002          U2.DJ1= 040000          $STERL  000742RG
D.VOUT= 000004           S1.ESC= 000004          US.MDM= 000020          U2.DZ1= 000100          $STFFE  001006RG
D.VPWF= 000006           S1.IBF= 100000          US.MNT= 000100          U2.ESC= 001000          $STFOR  001012RG
ERL      000100R     002 S1.IBY= 000200          US.OFL= 000001          U2.HFF= 010000          $STIN   001020RG
FE       000142R     002 S1.OBY= 000100          US.OUT= 000001          U2.HLD= 000040          $STLIS  001000RG
FO       000130R     002 S1.RAL= 000010          US.PUB= 000004          U2.LOG= 000400          $STLOG  000774RG
IE.EOF= ****** GX        S1.RNE= 000020          US.PWF= 000010          U2.LWC= 000001          $STRNG= 000304
IN       000150R     002 S1.RST= 000001          US.RED= 000002          U2.L3S= 000004          $STUNT  000200RG
INTR     000570R         S1.RUB= 000002          US.SHR= 000001          U2.L8S= 010000          $STVEC  000600RG
LI       000110R     002 S1.USI= 020000          US.SPU= 000002          U2.NEC= 004000          $STVFL  000710RG
LOG      000122R     002 S2.ACR= 000001          US.UMD= 000010          U2.PRV= 000010          $SUBXP= 000310
L.ASG   000010           S2.BRQ= 000020          US.VV = 000001          U2.RMT= 020000          $SWERL= ****** GX
L.LGTH= 000012           S2.CR = 000010          US.WCK= 000010          U2.R04= 100000          $SWFFE= ****** GX
L.LNK   000000           S2.FDX= 100000          U.ACP = 000032          U2.SCS= 000004          $SWFMT= ****** GX
L.NAM   000002           S2.FLF= 040000          U.ATT   000022          U2.SLV= 000200          $SWINT= ****** GX
L.TYPE  000005           S2.HFF= 020000          U.BUF   000024          U2.VT5= 000002          $SWLOG= ****** GX
L.UCB   000006           S2.HFL= 003400          U.CBF = 000032          U2.7CH= 010000          $SWLST= ****** GX
L.UNIT  000004           S2.HHT= 010000          U.CLI   177772          VEC      000060R    002 $TSTDV  000316RG
M.BFVH  000011           S2.IRQ= 000200          U.CNT   000030          VFL      000070R    002 $UCB  = ****** GX
M.BFVL  000012           S2.ORQ= 000100          U.CTL   000004          $ALPHA= 000322          $VERIF= ****** GX
M.LGTH= 000014           S2.SRQ= 000040          U.CTYP  000050          $ANY  = 000320          $$$FLG= 177777
M.LNK   000000           S2.VFL= 004000          U.CW1   000010          $BLANK= 000306          $$$KEY= 000006
M.UMRA  000002           S2.WRA= 000006          U.CW2   000012          $BUFRX= ****** GX       $$$STA= 000010R     002
M.UMRN  000004           S2.WRB= 000002          U.CW3   000014          $DEVHD= ****** GX       $$$TMP= 000026R     004
M.UMVH  000010           S3.BCC= 020000          U.CW4   000016          $DIGIT= 000324          .PNUMB= ****** GX
M.UMVL  000006           S3.DAO= 040000          U.DCB   000000          $DNUMB= 000314          .PNUMH= ****** GX
OPTION   000010R     002 S3.PCU= 100000          J.FCDE= 000040          $DVICE= ****** GX       .TPARS= ****** GX

. ABS.   177776      000
         001026      001
```

```
SYMBOL TABLE

$STATE  000166     U02
$KTAB   000016     003
$KSTK   000031     004
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  3819 WORDS  ( 15 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:01:21
[300,20]FMTPRS,[300,30]FMTPRS=[1,1]EXEMC.'ML,[300,10]FMTPRS
```

```
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                                .IDENT  /01.00/
                                ;
                                ;
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                                ;
                                ;  VERSION 01.00
                                ;
                                ; C. HESS       18-AUG-80
                                ; M. LEAVITT    24-DEC-80
                                ;
                                .NLIST  CND,BEX
                                ;
                                ;
                                ; MESSAGES
                                ;
000000   012   105   116   MSG1R8: .ASCIZ  <LF>/ENTER DATE (DD-MMM-YY): /
000032   110   104   101   MSG2R8: .ASCIZ      /HDA SERIAL NUMBER: /
                                .EVEN
                                ;
                                ; DATE FIELDS
                                ;
000056   112   101   116   DAT:    .ASCIZ  /JAN/
000062   106   105   102           .ASCIZ  /FEB/
000066   115   101   122           .ASCIZ  /MAR/
000072   101   120   122           .ASCIZ  /APR/
000076   115   101   131           .ASCIZ  /MAY/
000102   112   125   116           .ASCIZ  /JUN/
000106   112   125   114           .ASCIZ  /JUL/
000112   101   125   107           .ASCIZ  /AUG/
000116   123   105   120           .ASCIZ  /SEP/
000122   117   103   124           .ASCIZ  /OCT/
000126   116   117   126           .ASCIZ  /NOV/
000132   104   105   103           .ASCIZ  /DEC/
000136 000000                      .WORD   0
                                .EVEN
                                ;
                                ; VALID LIMITS FOR DATE FIELDS
                                ;
```

```
     60 000140  000001  000014          DATLMT: .WORD   1,12.           ; FOR MONTH
     61 000144  000001  000037                  .WORD   1,31.           ; FOR DAY
     62 000150  000000  000143                  .WORD   0,99.           ; FOR YEAR
     63 000154                          DPARS:: .BLKW   3               ; STORAGE FOR DATE CONVERSION
     64
     65         000116                  BASYR   == 78.                  ; BASE YEAR = 1978
     66
```

```
                                ;+
                                ; **-$RM80-FORMAT/VERIFY RM80 DISK PACKS
                                ;
                                ; THIS ROUTINE WILL INITIATE THE FORMAT AND/OR VERIFICATION
                                ; OF AN RM80 DISK PACK.
                                ;
                                ; INPUTS:
                                ;       DISK PARAMETERS SET TO ZERO
                                ;
                                ; OUTPUTS:
                                ;       NONE.
                                ;-

000162  105767  000000G         $RM80:: TSTB    $SWINT          ; SEE IF SSF/BSF INITIALIZATION MODE
000166  001022                          BNE     1$              ; IF NE, YES
000170  004767  000000G                 CALL    $RDSSF          ; READ SKIP SECTOR FILE
000174  004767  000000G                 CALL    $RDBSF          ; READ BAD SECTOR FILES
000200  016767  000010G 000000G         MOV     $SSF+10,$REVNM  ; GET CURRENT REVISION NUMBER
000206  005767  000310                  TST     8$              ; HAS DATE BEEN ENTERED AT LEAST ONCE ?
000212  001010                          BNE     1$              ; BR IF YES
000214  012700  000000'                 MOV     #MSG1R8,R0      ; 'ENTER DATE (DD-MMM-YY): '
000220  004767  000000G                 CALL    $PRMPT          ; PROMPT THE USER - USER'S RESPONSE MAY BE EITHER:
                                                                ;  'MM/DD/YY' OR 'DD-MMM-YY'
000224  004767  000274                  CALL    DATE            ; CONVERT USER'S ENTRY TO A BINARY DATE
000230  005267  000266                  INC     8$              ; INDICATE THAT DATE HAS BEEN ENTERED ONCE

000234  105767  000000G         1$:     TSTB    $SWLST          ; DISPLAY THE DEC STD 144 AND SSF FILES ?
000240  001405                          BEQ     2$              ; IF EQ, NO
000242  004767  000000G                 CALL    $RM80L          ; DISPLAY THE FILES
000246  105767  000000G                 TSTB    $SWFMT          ; FORMAT THE HDA ALSO ?
000252  001522                          BEQ     7$              ; IF EQ, NO

                                ; INFORM THE OPERATOR THAT DATA WILL BE DESTROYED

000254  012703  000000G         2$:     MOV     #$MSG23,R3      ; WARNING MESSAGE ADDRESS
000260  004767  000000G                 CALL    $UNTID          ; STORE MESSAGE AND DEVICE/UNIT
000264  012703  000000G                 MOV     #$MSG24,R3      ; ADDRSS OF MESSAGE SUFFIX
000270  004767  000000G                 CALL    $MOVE           ; MOVE THE SUFFIX
000274  012700  000144G                 MOV     #$BUF+100.,R0   ; PRINT WARNING MESSAGE
000300  004767  000000G                 CALL    $PRINT          ;
000304  012700  000000G                 MOV     #$MSG31,R0      ; GET CONFIRMATION ADDRESS
000310  004767  000000G                 CALL    $PRMPT          ; PROMPT AND GET OPERATOR'S RESPONSE
000314  001501                          BEQ     7$              ; IF EQ, RESPONSE WAS 'NO'
000316  122767  000131  000000G        CMPB    #'Y,$BUFRX      ; SEE IF RESPONSE WAS 'YES'
000324  001075                          BNE     7$              ; IF NE, RESPONSE WAS 'NO'
000326  105767  000000G                 TSTB    $SWINT          ; SEE IF SSF/BSF INITIALIZATION MODE
000332  001013                          BNE     3$              ; IF NE, YES
000334  012700  000000G                 MOV     #$MSGR8,R0      ; GET UPDATE MODE MESSAGE
000340  004767  000000G                 CALL    $PRMPT          ; PROMPT AND GET RESPONSE
000344  001451                          BEQ     6$              ; IF EQ, NO
000346  122767  000131  000000G        CMPB    #'Y,$BUFRX      ; WAS RESPONSE 'Y'?
000354  001045                          BNE     6$              ; IF NE, NO
000356  105267  000000G                 INCB    $SWMOD          ; SET THE MODIFY FLAG
000362  012700  000000'         3$:     MOV     #MSG1R8,R0      ; 'ENTER DATE (DD-MMM-YY): '
000366  004767  000000G                 CALL    $PRMPT          ; PROMPT THE USER - USER'S RESPONSE MAY BE EITHER:
                                                                ;  'MM/DD/YY' OR 'DD-MMM-YY'
000372  004767  000126                  CALL    DATE            ; CONVERT USER'S ENTRY TO A BINARY DATE
```

```
                                                INC     8$              ; INDICATE THAT DATE HAS BEEN ENTERED ONCE

000402  012700  000032'          4$:   MOV     #MSG2R8,R0      ; 'HDA SERIAL NUMBER: '
000406  004767  000000G                CALL    $PRMPT          ; PROMPT OPERATOR
000412  010304                        MOV     R3,R4           ; NUMBER OF BYTES ENTERED TO R4
000414  012705  000000G                MOV     #$BUFRX,R5      ; INPUT BUFFER ADDRESS
000420  012703  000000G                MOV     #$SNAME,R3      ; OUTPUT BUFFER ADDRESS
000424  004767  000000G                CALL    .DD2CT          ; CONVERT THE S/N TO BINARY
000430  103764                        BCS     4$              ; IF CS, BAD S/N ENTRY
000432  016746  000000G                MOV     $SNAME,-(SP)    ; CORRECT THE SERIAL NUMBER ORDER
000436  016767  000002G 000000G        MOV     $SNAME+2,$SNAME ; ...
000444  012667  000002G                MOV     (SP)+,$SNAME+2  ; ...
000450  105767  000000G                TSTB    $SWINT          ; INITIALIZE THE BAD SECTOR FILES ?
000454  001403                        BEQ     5$              ; IF EQ, NO
000456  004767  000000G                CALL    $RM80I          ; INIT THE DEC STD 144 AND SKIP SECTOR FILES
000462  000416                        BR      7$              ; EXIT

000464  004767  000000G          5$:   CALL    $RM80M          ; GET UPDATE MODE INFORMATION
000470  004767  000000G          6$:   CALL    $RDSSF          ; READ SKIP SECTOR FILE
000474  004767  000000G                CALL    $RDBSF          ; READ BAD SECTOR FILES
000500  004767  000000G                CALL    $RM80F          ; FORMAT THE DISK
000504  004767  000000G                CALL    $RM80V          ; VERIFY THE DISK FORMAT
000510  012700  000000G                MOV     #$MSG12,R0      ; GET ADDRESS OF MESSAGE
000514  004767  000000G                CALL    $PRINT          ; PRINT 'DONE !' MESSAGE
000520  000207                  7$:   RETURN

000522  000000                  8$:   .WORD   0               ; ONCE DATE FLAG
```

```
                                        ;+
                                        ; **-DATE-CONVERT USER'S RESPONSE TO BINARY DATE
                                        ;
                                        ; THIS ROUTINE WILL CONVERT THE ASCII DATE INPUTTED
                                        ; INTO '$BUFRX' AS EITHER [MM/DD/YY] OR [DD-MMM-YY] AND
                                        ; CONVERT IT TO BINARY AND PUT IT IN DATE PARAMETER
                                        ; STORAGE AREA.
                                        ;
                                        ; INPUTS:
                                        ;       '$BUFRX' CONTAINS ASCII STRING FOR DATE
                                        ;
                                        ; OUTPUTS:
                                        ;       DPARS CONTAINS BINARY REPRESENTATION
                                        ;       OF DATE
                                        ;
                                        ;-

000524  012701  000154'       DATE:   MOV     #DPARS,R1       ; POINT TO PARAMTER AREA
000530  012702  000003                 MOV     #3,R2           ; SET WORD COUNT
000534  005021                 1$:     CLR     (R1)+           ; ZERO NEXT WORD
000536  005302                         DEC     R2              ; DONE ?
000540  001375                         BNE     1$              ; IF NE NO
000542  012700  000000G                MOV     #$BUFRX,R0      ; GET BUFFER FOR USER'S RESPONSE
000546  004767  000000G        2$:     CALL    $CDTB           ; GET A NUMBER
000552  120227  000057                 CMPB    R2,#'/          ; TERMINATOR FOR DATE ?
000556  001466                         BEQ     10$             ; IF EQ YES
000560  120227  000055                 CMPB    R2,#'-          ; POSSIBLY DIFFERENT FORMAT ?
000564  001404                         BEQ     3$              ; IF EQ YES
000566  012700  000000G                MOV     #$MSG2,R0       ; NO, SYNTAX ERROR
000572  000167  000000G                JMP     $MSGWR          ; EXIT WITH WARNING STATUS

                                        ; GET DATE FIELD IN FORMAT [DD-MMM-YY]

000576  012705  000144'       3$:     MOV     #DATLMT+4,R5    ; POINT TO DAY LIMITS
000602  004767  000256                 CALL    TMTSTL          ; TEST LIMITS
000606  103446                         BCS     9$              ; IF CS ERROR
000610  010167  177342                 MOV     R1,DPARS+2      ; STORE DAY
000614  010003                         MOV     R0,R3           ; COPY BUFFER POINTER
000616  012701  000056'               MOV     #DAT,R1         ; POINT TO VALID MONTH NAMES
000622  005002                         CLR     R2              ; ZERO MONTH NUMBER
000624  105711                 4$:     TSTB    (R1)            ; END OF TABLE ?
000626  001411                         BEQ     6$              ; IF EQ YES, GOOD MONTH
000630  122021                         CMPB    (R0)+,(R1)+     ; NO, CHECK NEXT CHARACTER
000632  001774                         BEQ     4$              ; AND LOOP IF GOOD MATCH
000634  105721                 5$:     TSTB    (R1)+           ; END OF MONTH STRING ?
000636  001376                         BNE     5$              ; IF NE NO, LOOP
000640  010300                         MOV     R3,R0           ; YES, RESET BUFFER POINTER
000642  005202                         INC     R2              ; UPDATE MONTH INDEX
000644  105711                         TSTB    (R1)            ; END OF TABLE ?
000646  001366                         BNE     4$              ; IF NE NO, LOOP
000650  000425                         BR      9$              ; ZERO IS END OF MONTH LIST
000652  005202                 6$:     INC     R2              ; INCREMENT MONTH INDEX
000654  010267  177274                 MOV     R2,DPARS        ; SAVE IT
000660  112002                         MOVB    (R0)+,R2        ; GET NEXT CHARACTER
000662  120227  000055                 CMPB    R2,#'-          ; LEGAL TERMINATOR ?
000666  001401                         BEQ     7$              ; IF EQ YES
000670  000415                         BR      9$              ; NO, IT'S A SYNTAX ERROR
```

```
                                7$:     CALL    $CDTB           ; YES, GET YEAR
                                        MOV     #DATLMT+10,R5   ; GET LIMIT ON YEAR
                                        CALL    TMTSTL          ; TEST LIMIT ON YEAR
                                        BCS     9$              ; IF CS ERROR
                                        CMP     R1,#BASYR       ; CHECK YEAR ENTRY
                                        BLO     9$              ; IF LO, INVALID YEAR ENTRY
                                8$:     MOV     R1,DPARS+4      ; SAVE YEAR
                                        BR      12$             ; EXIT
                                9$:     MOV     #$MSG2,R0       ; GET SYNTAX ERROR MESSAGE
                                        JMP     $MSGWR          ; EXIT WITH WARNING STATUS

                                ; GET DATE FIELD IN FORMAT [MM/DD/YY]

                                10$:    MOV     #DPARS,R3       ; POINT TO DATE STORAGE FIELD
                                        MOV     #DATLMT,R5      ; GET POINTER TO MONTH LIMITS
                                11$:    CALL    TMTSTL          ; TEST LIMITS
                                        BCS     9$              ; IF CS ERROR, OUT OF BOUNDS
                                        MOV     R1,(R3)+        ; STORE IT
                                        CMPB    R2,#'/          ; GOOD TERMINATOR ?
                                        BNE     9$              ; IF NE NO, SYNTAX ERROR
                                        CALL    $CDTB           ; GET NEXT TWO DIGITS
                                        CALL    TMTSTL          ; TEST LIMITS
                                        BCS     9$              ; IF CS ERROR, OUT OF BOUNDS
                                        MOV     R1,(R3)+        ; STORE IT
                                        CMPB    R2,#'/          ; GOOD TERMINATOR ?
                                        BNE     9$              ; IF NE NO
                                        CALL    $CDTB           ; GET NEXT TWO DIGITS
                                        CALL    TMTSTL          ; TEST LIMITS
                                        BCS     9$              ; IF CS ERROR, OUT OF BOUNDS
                                        MOV     R1,(R3)         ; STORE IT
                                12$:    MOV     #DPARS,R3       ; DATE STORAGE FIELD
                                        SUB     #BASYR,4(R3)    ; SUBTRACT THE STARTING YEAR
                                        SWAB    4(R3)           ; POSITION YEAR IN UPPER BYTE
                                        ASL     4(R3)           ; SHIFT INTO BITS 9 - 15
                                        SWAB    (R3)            ; POSITION MONTH
                                        ASR     (R3)            ; SHIFT INTO BITS 5 - 8
                                        ASR     (R3)            ;
                                        ASR     (R3)            ;
                                        BIS     4(R3),(R3)      ; MERGE YEAR WITH MONTH
                                        BIS     2(R3),(R3)      ; MERGE DAY
                                        RETURN                  ; EXIT

                                ;+
                                ; **-TMTSTL - TEST DATE LIMITS
                                ;
                                ; THIS ROUTINE WILL TEST THE DATE AGAINST LIMITS SPECIFIED
                                ; BY A TWO WORD LIMIT ENTRY.
                                ;
                                ; INPUTS:
                                ;       R1 =    CONTAINS VALUE TO BE TESTED
                                ;       R5 =    POINTS TO TWO WORD LIMIT ENTRY
                                ;               WORD 1 - LOW LIMIT OF VALUE
                                ;               WORD 2 - HIGH LIMIT OF VALUE
                                ;
                                ; OUTPUTS:
                                ;       R1 =    UNCHANGED
                                ;       R5 =    UPDATED TO NEXT LIMIT ENTRY
```

```
                                ;       CC =    GOOD VALUE, LOW<=X<-HIGH
                                ;       CS =    BAD VALUE,  LOW>X OR X>HIGH
                                ;
                                ;-

001064  020125                  TMTSTL: CMP     R1,(R5)+        ; IS VALUE LOWER THAN LOW LIMIT ?
001066  002404                          BLT     1$              ; IF LT YES
001070  020125                          CMP     R1,(R5)+        ; IS IT HIGHER THAN HIGH LIMIT ?
001072  003002                          BGT     1$              ; IF GT YES
001074  000241                          CLC                     ; NO, GOO VALUE
001076  000207                          RETURN                  ; EXIT
001100  000261                  1$:     SEC                     ; SET ERROR FLAG
001102  000207                          RETURN                  ; EXIT

        000001                  .END
```

SYMBOL TABLE

```
BASYR = 000116 G        MSG2R8  000032R        $MSG12= ****** GX       $RDSSF= ****** GX       $SNAME= ****** GX
CR    = 000015          TMTSTL  001064R        $MSG2 = ****** GX       $REVNM= ****** GX       $SSF  = ****** GX
DAT     000056R         $BUF  = ****** GX       $MSG23= ****** GX       $RM80   000162RG        $SWFMT= ****** GX
DATE    000524R         $BUFRX= ****** GX       $MSG24= ****** GX       $RM80F= ****** GX       $SWINT= ****** GX
DATLMT  000140R         $CDTB = ****** GX       $MSG31= ****** GX       $RM80I= ****** GX       $SWLST= ****** GX
DPARS   000154RG        $MOVE = ****** GX       $PRINT= ****** GX       $RM80L= ****** GX       $SWMOD= ****** GX
LF    = 000012          $MSGR8= ****** GX       $PRMPT= ****** GX       $RM80M= ****** GX       $UNTID= ****** GX
MSG1R8  000000R         $MSGWR= ****** GX       $RDBSF= ****** GX       $RM80V= ****** GX       .DD2CT= ****** GX

. ABS.  000000      000
        001104      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  456 WORDS  ( 2 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:11
[300,20]FMTR80,[300,30]FMTR80=[300,10]FMTR80
```

```
                            .TITLE FMTR8F - RM80 FORMAT MODULE
                            .IDENT /01.00/
                            ;
                            ;
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                            ;
                            ;
                            ; VERSION 01.00
                            ;
                            ; C. HESS       17-AUG-80
                            ; M. LEAVITT    14-JAN-81
                            ;
                            ;
                            .NLIST  BEX
                            ;
000000    104   122   111   MSG50R: .ASCIZ  /DRIVE ERROR DURING FORMAT/
000032    106   117   122   MSG51R: .ASCIZ  /FORMAT CONTINUING/
000054    106   117   122   MSG53R: .ASCIZ  /FORMAT TERMINATING/
000077    122   115   103   MSG61R: .ASCIZ  /RMCS1=/
000106    122   115   103   MSG62R: .ASCIZ  /RMCS2=/
000115    122   115   105   MSG63R: .ASCIZ  /RMER1=/
000124    122   115   105   MSG64R: .ASCIZ  /RMER2=/
000133    122   115   104   MSG65R: .ASCIZ  /RMDA=/
000141    124   122   101   MSG66R: .ASCIZ  /TRACK RE-WRITE SUCCESSFUL/
000173    124   122   101   MSG67R: .ASCIZ  /TRACK RE-WRITE FAILURE/
000222    123   125   103   MSG68R: .ASCIZ  /SUCCESSIVE SEEK ERRORS/
                            ;
                            .EVEN
                            ;
                            ; WORKING LOCATIONS
                            ;
000252  000000               $ERCS1: .WORD   0               ; CONTROL STATUS REG 1
000254  000000               $ERCS2: .WORD   0               ; STATUS REG 2
000256  000000               $ERER1: .WORD   0               ; ERROR REGISTER 1
000260  000000               $ERER2: .WORD   0               ; ERROR REGISTER 2
000262  000000               $ERDA:  .WORD   0               ; TRACK/SECTOR ADDRESS
000264  000000               $FLBUF: .WORD   0               ; BUFFER ADDRESS
```

```
                                        ;+
                                        ; **-$R80TF-FORMAT A SINGLE TRACK
                                        ; **-$R80SF-FORMAT BSF, SSF AND ALTERNATE DEC144 CYLINDERS
                                        ; **-$RM80F-FORMAT ALL CYLINDERS OR FE CYLINDERS
                                        ;
                                        ; THIS ROUTINE WILL FORMAT AN RM80 DISK PACK.  FULL TRACKS
                                        ;  (32. SECTORS) OF HEADERS ARE WRITTEN UNTIL THE MAXIMUM
                                        ;  DISK ADDRESS IS REACHED.
                                        ;
                                        ; INPUTS:
                                        ;       DISK PARAMETERS SET TO ZERO
                                        ;       MDBSF, UDBSF, & SSF READ, VALIDATED, AND IN MEMORY
                                        ;       $CYL,$TRK,$SEC PRESET FOR '$R80TF' ENTRY
                                        ;       FORMAT FE CYLINDERS ONLY IF '$SWFFE=1'
                                        ;
                                        ; OUTPUTS:
                                        ;       NONE.
                                        ;-

                                        ; FORMAT BSF(558.,13.), SSF(559.,0) AND ALTERNATE DEC144(559.,1) TRACKS

000266  012767  001056  000000G $R80SF::MOV     #558.,$CYL      ; STARTING CYLINDER
000274  012767  000015  000000G         MOV     #13.,$TRK       ;      ''    TRACK
000302  004767  000212                  CALL    FMTDSK          ; FORMAT THE DEC STD 144 TRACK
000306  012767  001057  000000G         MOV     #559.,$CYL      ; STARTING CYLINDER
000314  005067  000000G                 CLR     $TRK            ;      ''    TRACK
000320  004767  000174                  CALL    FMTDSK          ; FORMAT THE SSF TRACK
000324  005267  000000G                 INC     $TRK            ; FORMAT THE ALTERNATE DEC144 TRACK

                                        ; FORMAT A SINGLE TRACK

000330  004767  000000G         $R80TF::CALL    $MVPAT          ; LOAD THE DATA PATTERN
000334  000471                          BR      FMTDSK          ; FORMAT THE TRACK $CYL,$TRK


                                        ; FORMAT ALL CYLINDERS (0,0 TO 560.,13.) OR BSF/SSF/FE CYLINDERS (558.,13.- 560.,13.)

000336  005001                  $RM80F::CLR     R1              ; SET NULL CARRIAGE CONTROL
000340  012700  000000G                 MOV     #$MSG6,R0       ; TELL OPERATOR
000344  004767  000000G                 CALL    $PRNTO          ; 'START FORMATTING'
000350  005001                          CLR     R1              ; SET NULL CARRIAGE CONTROL
000352  105767  000000G                 TSTB    $SWFFE          ; FORMAT FE CYLINDERS ONLY ?
000356  001011                          BNE     1$              ; BR IF YES
000360  012700  000000G                 MOV     #$MSG6A,R0      ; TELL OPERATOR WHICH CYLINDERS
000364  004767  000000G                 CALL    $PRNTO          ; ' -ALL CYLINDERS- '
000370  005067  000000G                 CLR     $CYL            ; START CYLINDER=0
000374  005067  000000G                 CLR     $TRK            ; START TRACK=0
000400  000412                          BR      2$              ; FORMAT THE TRACKS

000402  012700  000000G         1$:     MOV     #$MSG6B,R0      ; TELL OPERATOR WHICH CYLINDERS
000406  004767  000000G                 CALL    $PRNTO          ; ' -FE CYLINDERS- '
000412  012767  001056  000000G         MOV     #558.,$CYL      ; START CYLINDER=558. (BSF/SSF/FE CYLINDERS)
000420  012767  000015  000000G         MOV     #13.,$TRK       ; START TRACK=13.
000426  004767  000000G         2$:     CALL    $MVPAT          ; LOAD THE DATA PATTERN
000432  004767  000062          3$:     CALL    FMTDSK          ; FORMAT THE DISK
000436  004767  000000G                 CALL    $TSTMX          ; UPDATE DISK ADDRESSES
```

```
                                        BCC     4$              ; IF CS, NOT FINSIHED, ELSE
                                        RETURN                  ; EXIT FORMAT

000446  022767  001057  000000G 4$:     CMP     #559.,$CYL      ; WAS SSF JUST WRITTEN ?
000454  001366                          BNE     3$              ; BR IF NO
000456  022767  000002  000000G         CMP     #2,$TRK         ; WERE BSF/SSF TRACKS JUST WRITTEN ?
000464  001362                          BNE     3$              ; BR IF NO, ELSE
000466  016746  000000G                 MOV     $CYL,-(SP)      ; SAVE CURRENT CYLINDER ADDRESS
000472  016746  000000G                 MOV     $TRK,-(SP)      ; SAVE CURRENT TRACK ADDRESS
000476  004767  000000G                 CALL    $WTSSF          ; RE-WRITE THE SSF
000502  004767  000000G                 CALL    $WTBSF          ; RE-WRITE THE DEC144 TRKS (PRIMARY AND SECONDARY)
000506  012667  000000G                 MOV     (SP)+,$TRK      ; RESTORE TRACK ADDRESS
000512  012667  000000G                 MOV     (SP)+,$CYL      ; RESTORE CYLINDER ADDRESS
000516  000745                          BR      3$              ; WRITE NEXT TRACK

                                ; ACTUAL FORMAT ROUTINE

000520  012703  000000G         FMTDSK: MOV     #$PHYDV,R3      ; 'FORMAT' DEVICE PARAMETERS
000524  004767  000000G                 CALL    $UPDMX          ; UPDATE THE MAX VALUES
000530  012700  000000G                 MOV     #$BUF,R0        ; RELOAD THE BUFFER ADDRESS
000534  105067  000000G                 CLRB    SKPFRE          ; CLEAR SKIP SECTOR FLAG
000540  005067  000000G                 CLR     $SEC            ; START AT SECTOR ZERO

                                ; CREATE THE HEADER PATTERN

000544  004767  000000G         1$:     CALL    GENHDR          ; GENERATE HEADER PATTERN
000550  005267  000000G                 INC     $SEC            ; UPDATE SECTOR NUMBER
000554  026767  000000G 000000G         CMP     $SEC,$MXSEC     ; ALL SECTORS DONE?
000562  001370                          BNE     1$              ; IF NE NO
000564  005067  000000G                 CLR     $SEC            ; RESET SECTOR NUMBER

                                ; NOW WRITE THE HEADER AND DATA ONTO THE DISK.

000570  016767  000000G 000000G 2$:     MOV     TRKSZ,$XFRSZ    ; LOAD BYTE COUNT FOR ONE TRACK
000576  004767  000000G                 CALL    $CVTDA          ; CONVERT DISK ADDRESS TO LBN
000602  012705  000000G                 MOV     #$BUF,R5        ; SET BUFFER ADDRESS
000606  004767  000000G         3$:     CALL    $DSKWH          ; WRITE HEADER/DATA FOR THIS TRACK
000612  005767  000000G         4$:     TST     $RGBUF          ; ANY DISK ERRORS?
000616  100401                          BMI     5$              ; IF MI, YES
000620  000207                          RETURN                  ; OTHERWISE, RETURN

                                ; HANDLE THE ERROR

000622  032767  004000  000014G 5$:     BIT     #4000,$RGBUF+14 ; WRITE LOCK ERROR?
000630  001402                          BEQ     6$              ; IF EQ NO
000632  000167  000000G                 JMP     $WLKER          ; INFORM THE USER

                                ; SEND ERROR MESSAGE

000636  004767  000276          6$:     CALL    $FLRGS          ; SAVE FAILING DATA
000642  012700  000000'                 MOV     #MSG50R,R0      ; 'DRIVE ERROR DURING FORMAT'
000646  012701  000060                  MOV     #60,R1          ; CARRIAGE CONTROL CHARACTER
000652  004767  000000G                 CALL    $PRNTO          ; SEND MESSAGE
000656  004767  000064                  CALL    $MGPRE          ; SEND DISK ADDRESSES
000662  105367  000000G                 DECB    $SWERL          ; DECREMENT THE ERROR LIMIT
000666  001014                          BNE     7$              ; IF NE, ERROR LIMIT NOT EXCEEDED
000670  012700  000000G                 MOV     #$MSG45,R0      ; 'ERROR LIMIT EXCEEDED'
```

```
                        000674  012701  000060                  MOV     #60,R1          ; CARRIAGE CONTROL CHARACTER
                        000700  004767  000000G                 CALL    $PRNTO          ; SEND MESSAGE
                        000704  012700  000054'                 MOV     #MSG53R,R0      ; 'FORMAT TERMINATING'
                        000710  004767  000000G                 CALL    $PRINT          ; PRINT THE MESSAGE
                        000714  000167  000000G                 JMP     $FMTEX          ; EXIT THE FORMATTER

                                                        ; IF THE ERROR IS A 'SKI', DO A RECAL

                        000720  012700  000032'         7$:     MOV     #MSG51R,R0      ; 'FORMAT CONTINUING'
                        000724  004767  000000G                 CALL    $PRINT          ; SEND MESSAGE
                        000730  032767  040000  000042G        BIT     #40000,$RGBUF+42        ; SEE IF ERROR WAS A SEEK INCOMPLETE
                        000736  001714                          BEQ     2$              ; IF EQ, NO
                        000740  004767  000000G                 CALL    $HOMSK          ; ENTRY POINT FOR RETRY WITH RECAL
                        000744  000711                          BR      2$              ; TRY AGAIN

                                                        ;+
                                                        ; **-$MGPRE-PREPARE AND SEND DISK ADDRESSES TO OPERATOR
                                                        ;
                                                        ; INPUTS:
                                                        ;       $FLCYL,$FLTRK,$FLSEC LOADED
                                                        ;
                                                        ; OUTPUTS:
                                                        ;       ERROR MESSAGE
                                                        ;-

                        000746  012700  000000G         $MGPRE::MOV     #$CR,R0         ;ADDRESS OF MESSAGE
                        000752  004767  000000G                 CALL    $PRINT          ;CR-LF
                        000756  016701  177270                  MOV     $ERCS1,R1       ;GET RMCS1 AND
                        000762  012703  000077'                 MOV     #MSG61R,R3      ;ADDRESS OF MESSAGE
                        000766  004767  000000G                 CALL    $EROCT          ;"RMSC1 = XXXXX"
                        000772  016701  177256                  MOV     $ERCS2,R1       ;GET RMCS2 AND
                        000776  012703  000106'                 MOV     #MSG62R,R3      ;ADDRESS OF MESSAGE
                        001002  004767  000000G                 CALL    $EROCT          ;"RMSC2 = XXXXX"
                        001006  016701  177244                  MOV     $ERER1,R1       ;GET RMER1 AND
                        001012  012703  000115'                 MOV     #MSG63R,R3      ;ADDRESS OF MESSAGE
                        001016  004767  000000G                 CALL    $EROCT          ;"RMER1 = XXXXX"
                        001022  016701  177232                  MOV     $ERER2,R1       ;GET RMER2 AND
                        001026  012703  000124'                 MOV     #MSG64R,R3      ;ADDRESS OF MESSAGE
                        001032  004767  000000G                 CALL    $EROCT          ;"RMER2 = XXXXX"
                        001036  016701  177220                  MOV     $ERDA,R1        ;GET RMDA AND
                        001042  012703  000133'                 MOV     #MSG65R,R3      ;ADDRESS OF MESSAGE
                        001046  004767  000000G                 CALL    $EROCT          ;"RMDA  = XXXXX"
                        001052  012700  000000G                 MOV     #$CR,R0         ;ADDRESS OF MESSAGE
                        001056  004767  000000G                 CALL    $PRINT          ;CR-LF

                                                        ;PRINT ERROR POSITION, CYLINDER, TRACK AND SECTOR IN DECIMAL

                        001062  016701  000000G                 MOV     $FLCYL,R1       ;GET FAILING CYLINDER AND
                        001066  012703  000000G                 MOV     #$MSG15,R3      ;ADDRESS OF MESSAGE
                        001072  004767  000000G                 CALL    $EROUT          ;"CYLINDER = XXX."
                        001076  016701  000000G                 MOV     $FLTRK,R1       ;GET FAILING TRACK AND
                        001102  012703  000000G                 MOV     #$MSG16,R3      ;ADDRESS OF MESSAGE
                        001106  004767  000000G                 CALL    $EROUT          ;"TRACK = XX."
                        001112  016701  000000G                 MOV     $FLSEC,R1       ;GET FAILING SECTOR AND
                        001116  012703  000000G                 MOV     #$MSG17,R3      ;ADDRESS OF MESSAGE
                        001122  004767  000000G                 CALL    $EROUT          ; "SECTOR = XX."
                        001126  012700  000000G                 MOV     #$CR,R0         ;GET ADDRESS OF MESSAGE
```

```
                                        ;+
                                        ; **-$FLRGS-ROUTINE TO SAVE FAILING DISK ADDRESSES AND REGISTERS
                                        ;
                                        ; INPUTS:
                                        ;       $CYL, $TRK SET TO CURRENT CYLINDER AND TRACK
                                        ;       $RGBUF CONTAINS IMAGE OF LATEST H/W REGS (SET BY DRIVER)
                                        ;
                                        ; OUTPUTS:
                                        ;       $ERCS1 - CONTROL STATUS REG 1
                                        ;       $ERCS2 - CONTROL STATUS REG 2
                                        ;       $ERER1 - ERROR REG 1
                                        ;       $ERER2 - ERROR REG 2
                                        ;       $ERDA  - TRK/SECTOR REG
                                        ;       $FLCYL - FAILING CYLINDER
                                        ;       $FLTRK - FAILING TRACK
                                        ;       $FLSEC - FAILING SECTOR
                                        ;-
001140  016705  000006G         $FLRGS::MOV     $RGBUF+6,R5     ; RECOVER FAILING SECTOR ADDRESS
001144  042705  177740                  BIC     #177740,R5      ; ISOLATE SECTOR NO.
001150  001004                          BNE     1$              ;
001152  012767  000037  000000G         MOV     #31.,$FLSEC     ; MUST HAVE BEEN LAST SECTOR
001160  000403                          BR      2$              ;
001162  005305                  1$:     DEC     R5              ; BACKUP ONE
001164  010567  000000G                 MOV     R5,$FLSEC       ; SET SECTOR NUMBER
001170  016767  000000G 000000G 2$:     MOV     $CYL,$FLCYL     ;  "  CYLINDER
001176  016767  000000G 000000G         MOV     $TRK,$FLTRK     ;  "  TRACK

                                ; SAVE THE RM80 REGISTERS

0u1204  012705  000000G                 MOV     #$RGBUF,R5      ; REGISTER BUFFER
001210  011567  177036                  MOV     (R5),$ERCS1     ; RMCS1
001214  016567  000010  177032          MOV     10(R5),$ERCS2   ; RMCS2
001222  016567  000014  177026          MOV     14(R5),$ERER1   ; RMER1
001230  016567  000042  177022          MOV     42(R5),$ERER2   ; RMER2
001236  016567  000006  177016          MOV     6(R5),$ERDA     ; RMDA
001244  005067  000000G                 CLR     $RGBUF          ; CLEAR ERROR INDICATOR
001250  000207                          RETURN                  ;

        000001                  .END
```

FMTR8F - RM80 FORMAT MODULE MACRO M1113 12-JAN-82 11:04 PAGE 2-4 SEQ 0082

SYMBOL TABLE

```
FMTDSK  000520R          SKPFRE= ****** GX       $EROCT= ****** GX       $MSG17= ****** GX       $R80SF  000266RG
GENHDR= ****** GX        TRKSZ = ****** GX       $EROUT= ****** GX       $MSG45= ****** GX       $R80TF  000330RG
MSG50R  000000R          $BUF  = ****** GX       $FLBUF  000264R         $MSG6 = ****** GX       $SEC  = ****** GX
MSG51R  000032R          $CR   = ****** GX       $FLCYL= ****** GX       $MSG6A= ****** GX       $SWERL= ****** GX
MSG53R  000054R          $CVTDA= ****** GX       $FLRGS  001140RG        $MSG6B= ****** GX       $SWFFE= ****** GX
MSG61R  000077R          $CYL  = ****** GX       $FLSEC= ****** GX       $MVPAT= ****** GX       $TRK  = ****** GX
MSG62R  000106R          $DSKWH= ****** GX       $FLTRK= ****** GX       $MXSEC= ****** GX       $TSTMX= ****** GX
MSG63R  000115R          $ERCS1  000252R         $FMTEX= ****** GX       $PHYDV= ****** GX       $UPDMX= ****** GX
MSG64R  000124R          $ERCS2  000254R         $HOMSK= ****** GX       $PRINT= ****** GX       $WLKER= ****** GX
MSG65R  000133R          $ERDA   000262R         $MGPRE  000746RG        $PRNTO= ****** GX       $WTBSF= ****** GX
MSG66R  000141R          $ERER1  000256R         $MSG15= ****** GX       $RGBUF= ****** GX       $WTSSF= ****** GX
MSG67R  000173R          $ERER2  000260R         $MSG16= ****** GX       $RM80F  000336RG        $XFRSZ= ****** GX
MSG68R  000222R

. ABS.  000000     000
        001252     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  522 WORDS  ( 3 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:11
[300,20]FMTR8F,[300,30]FMTR8F=[300,10]FMTR8F
```

```
                        .TITLE  FMTR8V - VERIFY RM80 DISKS
                        .IDENT  /01.00/
                        ;
                        ;
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                        ;
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                        ;
                        ;
                        ;  VERSION 01.00
                        ;
                        ; C. HESS       22-AUG-80
                        ; M. LEAVITT    14-JAN-81
                        ;
                        .NLIST  BEX
000000  126  105  122    MSG2V:  .ASCIZ  /VERIFY TERMINATING/
000023  116  117  116    MSG3V:  .ASCIZ  /NON DATA ERROR DURING VERIFY/
000060  126  105  122    MSG4V:  .ASCIZ  /VERIFY CONTINUING/
000102  110  105  101    MSG5V:  .ASCIZ  @HEADER/DATA ERROR DURING VERIFY@
                        .EVEN
                        ;
                        ; WORKING LOCATIONS
                        ;
000142  000000          TRKER:  .WORD   0               ; TRACK ERROR COUNT
000144                  SECTBL: .BLKB   32.             ; SECTOR ERROR TABLE
000204  000000          LASTER: .WORD   0               ; LAST SECTOR IN ERROR DURING CURRENT VERIFICATION
                                                        ; PASS
000206  000000          XFRSEC: .WORD   0               ; NUMBER OF SECTORS ACTUALLY VERIFIED
000210  000000          ENDSEC: .WORD   0               ; ENDING SECTOR ADDRESS
000212  000000          BEGSEC: .WORD   0               ; STARTING SECTOR ADDRESS
000214  000000          VFYCNT: .WORD   0               ; VERIFICATION PASSES
```

```
                        ;+
                        ; **-$RM80V-VERIFICATION ROUTINE FOR RM80 DISK PACKS
                        ;
                        ; TRACK COMPLETE <= 1
                        ; REPEAT PROCESS UNTIL PHYSICAL DISK ADDRESS .EQ. (561,0,0) ($TSTMX)
                        ;    IF TRACK COMPLETE .NE. 0
                        ;        THEN START SECTOR <= 0
                        ;             END SECTOR <= $MXSEC
                        ;    TRACK ERROR COUNT ('TRKER') <= 0
                        ;    CLEAR SECTOR ERROR TABLE
                        ;    GENERATE TRACK BUFFER
                        ;    WORD COUNT <= ((END SECTOR)-(START SECTOR)+1)*258
                        ;    VERIFICATION PASS COUNT ('VFYCNT') <= $VERIF
                        ;    REPEAT WRITE CHECK UNTIL ('VFYCNT' .EQ. 0 .OR. SECTORS TRANSFERED .EQ. 0)
                        ;        IF ERROR
                        ;            THEN CALL $CKERR
                        ;                 IF ERROR IS A NON DATA ERROR
                        ;                      THEN RETRY ERROR
                        ;        'VFYCNT' = 'VFYCNT' - 1
                        ;    ENDREPEAT
                        ;    IF TRKER .NE. 0
                        ;        THEN CALL 'VFYSEC'
                        ;             REGENERATE THE TRACK BUFFER (GENHDR)
                        ;             RE-FORMAT TRACK FROM SECTOR 0 TO SECTOR 31
                        ;    IF ENDSEC .NE. 31
                        ;        THEN START SECTOR <= LAST ERROR SECTOR + 1
                        ;             END SECTOR <= 31
                        ;             ELSE PHYSICAL ADDRESS = PHYSICAL ADDRESS + 32 SECTORS
                        ; ENDREPEAT
                        ; RE-WRITE BSF & SSF
                        ; EOJ
                        ;
                        ;-

000216  012700  000000G         $RM80V::MOV     #$MSG11,R0      ; GET VERIFICATION STARTING MESSAGE
000222  004767  000000G                 CALL    $PRINT          ; PRINT THE MESSAGE
000226  012703  000000G                 MOV     #$PHYDV,R3      ; PHYSICAL DEVICE GEOMETRY POINTER
000232  004767  000000G                 CALL    $UPDMX          ; UPDATE THE LIMITS
000236  004767  000000G                 CALL    $HOMSK          ; ISSUE A RECAL
000242  105767  000000G                 TSTB    $SWFFE          ; VERIFY FE CYLINDERS ONLY ?
000246  001005                         BNE     1$              ; BR IF YES
000250  005067  000000G                 CLR     $CYL            ; STARTING CYLINDER=0
000254  005067  000000G                 CLR     $TRK            ; STARTING TRACK=0
000260  000406                         BR      2$
000262  012767  001056  000000G 1$:     MOV     #558.,$CYL      ; STARTING CYLINDER=558.
000270  012767  000015  000000G         MOV     #13.,$TRK       ; STARTING TRACK=13.
000276  005067  000000G         2$:     CLR     $SEC            ; STARTING SECTOR=0
000302  005067  177634                 CLR     TRKER           ; CLEAR THE TRACK ERROR COUNT
000306  005067  177700                 CLR     BEGSEC          ; CLEAR THE STARTING SECTOR
000312  016767  000000G 177670         MOV     $MXSEC,ENDSEC   ; LOAD THE ENDING SECTOR ADDRESS
000320  005367  177664                 DEC     ENDSEC          ; CORRECT THE VALUE
000324  004767  000000G                 CALL    $MVPAT          ; LOAD THE DATA PATTERN
000330  026727  000000G 001056  3$:     CMP     $CYL,#558.      ; IS THIS THE BSF CYLINDER ADDRESS ?
000336  001016                         BNE     4$              ; BR IF NO
000340  026727  000000G 000015         CMP     $TRK,#13.       ; IS THIS THE BSF TRACK ADDRESS ?
000346  001012                         BNE     4$              ; BR IF NO
000350  016746  000000G                 MOV     $CYL,-(SP)      ; SAVE CURRENT CYLINDER ADDRESS
```

```
                                                MOV     $TRK,-(SP)      ; SAVE CURRENT TRACK ADDRESS
                                                CALL    $R80SF          ; RE-FORMAT BSF/SSF HEADERS AND DATA
                                                MOV     (SP)+,$TRK      ; RESTORE TRACK ADDRESS
                                                MOV     (SP)+,$CYL      ; RESTORE CYLINDER ADDRESS
                                        4$:     CLRB    SKPFRE          ; CLEAR SKIPPED SECTOR FLAG
                                        5$:     MOV     #16.,R1         ; LOOP CONSTANT
                                                MOV     #SECTBL,R0      ; TABLE ADDRESS
                                        6$:     CLR     (R0)+           ; CLEAR TWO LOCATIONS
                                                DEC     R1              ; DECREMENT THE LOOP COUNTER
                                                BNE     6$              ; IF NE, NOT FINISHED
                                                MOVB    $VERIF,VFYCNT   ; LOAD THE VERIFICATION COUNT
                                        7$:     MOV     #$BUF,R0        ; BUFFER ADDRESS
                                                MOV     BEGSEC,$SEC     ; LOAD THE SECTOR ADDRESS
                                        8$:     CALL    GENHDR          ; GENERATE A HEADER
                                                INC     $SEC            ; INCREMENT THE SECTOR
                                                CMP     $SEC,ENDSEC     ; SEE IF FINISHED
                                                BLOS    8$              ; IF LOS, NO
                                        9$:     MOV     BEGSEC,$SEC     ; RESET THE SECTOR ADDRESS
                                                MOV     ENDSEC,R0       ; ENDING SECTOR ADDRESS
                                                SUB     BEGSEC,R0       ; SUBTRACT STARTING ADDRESS
                                                INC     R0              ; ALLOW A SINGLE SECTOR TRANSFER
                                                MOV     #516.,R1        ; SECTOR (INCLUDING HEADER) SIZE(IN BYTES)
                                                CALL    $MULT           ; CALCULATE THE BYTE COUNT
                                                MOV     R1,$XFRSZ       ; LOAD THE BYTE COUNT
                                                CALL    $CVTDA          ; CONVERT DISK ADDRESS TO AN LBN
                                        10$:    MOV     #$BUF,R5        ; BUFFER ADDRESS
                                                CALL    $DSKWC          ; WRITE CHECK
                                                TST     $RGBUF          ; SEE IF ANY ERRORS
                                                BMI     11$             ; IF MI, YES
                                                DEC     VFYCNT          ; DECREMENT THE VERIFY COUNT
                                                BNE     10$             ; IF NE, NO  FINISHED WITH THIS
                                                                        ;  VERIFICATION PASS
                                                BR      13$             ; SEE IF FINSIHED WITH THIS TRACK

                                        ; PROCESS THE ERROR

                                        11$:    CALL    CKERR           ; SEE WHICH TYPE OF ERROR IT IS
                                                BCS     9$              ; IF CS, NON-DATA ERROR - RETRY
                                                TST     XFRSEC          ; SEE IF ANY SECTORS WERE TRANSFERED
                                                BEQ     12$             ; IF EQ, NO
                                                DEC     VFYCNT          ; DECREMENT THE VERIFICATION COUNT FOR THIS PASS
                                                BNE     7$              ; IF NE, MORE TO DO
                                                BR      13$             ; SEE IF FINISHED WITH THE CURRENT TRACK
                                        12$:    MOV     BEGSEC,-(SP)    ; SEE IF THE ERROR IS THE LAST SECTOR
                                                INC     (SP)            ; CORRECT VALUE FOR THE COMPARE
                                                CMP     $MXSEC,(SP)+    ; ERROR ON SINGLE SECTOR TRANSFER BEGINNING
                                                                        ;  WITH SECTOR 31 ?
                                                BNE     7$              ; IF NE, NO
                                        13$:    TST     TRKER           ; ANY NEW ERRORS ON THIS TRACK ?
                                                BEQ     14$             ; IF EQ, NO
                                                CALL    VFYSEC          ; VERIFY THE SECTORS IN ERROR
                                                CALL    $R80TF          ; REFORMAT THE TRACK AND MARK NEW DEFECTS
                                        14$:    MOV     ENDSEC,R0       ; CHECK THE ENDING SECTOR
                                                INC     R0              ; CORRECT IT
                                                CMP     R0,$MXSEC       ; SEE IF FINSIHED
                                                BEQ     15$             ; IF EQ, YES
                                                MOV     LASTER,R0       ; GET THE LAST ERROR SECTOR ADDRESS
```

```
                                                INC     R0              ; CORRECT VALUE
                                                CMP     R0,$MXSEC       ; SEE IF AT MAX SECTOR
                                                BEQ     15$             ; IF EQ, YES
                                                MOV     LASTER,BEGSEC   ; RELOAD THE STARTING SECTOR
                                                INC     BEGSEC          ; START WITH THE FIRST GOOD SECTOR
                                                MOV     $MXSEC,ENDSEC   ; RELOAD THE ENDING SECTOR
                                                DEC     ENDSEC          ; CORRECT THE VALUE
                                                BR      5$              ; CONTINUE

                                        15$:    CALL    $TSTMX          ; INCREMENT THE PHYSICAL ADDRESS
                                                BCS     16$             ; IF CS, FINISHED
                                                MOV     $MXSEC,ENDSEC   ; RELOAD ENDING SECTOR FOR THE TRACK
                                                DEC     ENDSEC          ; MAKE INTO AN ADDRESS
                                                CLR     BEGSEC          ; START WITH SECTOR 0
                                                JMP     3$

                                        16$:    CALL    $WTSSF          ; RE-WRITE THE SSF
                                                CALL    $WTBSF          ; RE-WRITE THE DEC STD 144 TRACKS (PRIMARY AND
                                                                        ; SECONDARY
                                                RETURN

                                        ;+
                                        ; **-VFYSEC-VERIFY THE SECTOR(S) IN ERROR
                                        ;
                                        ; THIS ROUTINE WILL RE-READ THE SECTORS WHICH GAVE ERRORS DURING THE VERIFY
                                        ;  PASS ON THE CURRENT TRACK.  ANY SECTOR FAILING DURING THE RE-READ PASS
                                        ;  WILL BE CONSIDERED DEFECTIVE.
                                        ;
                                        ; REPEAT PROCESS UNTIL TRACK ERROR COUNT ('TRKER') .EQ. 0
                                        ;     FIND NEXT SECTOR IN SECTOR ERROR TABLE ('SECTBL')
                                        ;     REPEAT WRITE CHECK FOR SECTOR ENTRY IN 'SECTBL'
                                        ;     UNTIL ('SECTBL'(SECTOR) .LT. 0) .OR. (HEADER FIELD OR DATA FIELD ERROR FOR SECTOR)
                                        ;         IF 'SECTBL'(SECTOR) .GE. 0
                                        ;             THEN IF NO SKIP SECTOR ON TRACK .AND. '$HDRFG' = 0
                                        ;                     THEN PUT SECTOR IN SSF
                                        ;                     ELSE IF SECTOR IS NOT IN THE FE CYLINDERS
                                        ;                             THEN PUT SECTOR IN FEBSF
                                        ;                             ELSE PUT SECTOR IN UDBSF
                                        ;         LAST ERROR SECTOR ON TRACK 'LASTER' <= CURRENT ERROR SECTOR
                                        ;         TRKER = TRKER - 1
                                        ; ENDREPEAT
                                        ;
                                        ; INPUTS:
                                        ;       SECTBL - CONTAINS ADDRESSES OF SECTORS IN ERROR
                                        ;       $CYL,$TRK,$SEC CONTAINS ADDRESS OF CURRENT TRACK
                                        ;       TRKER .NE. 0
                                        ;
                                        ; OUTPUTS:
                                        ;       SECTBL CLEARED
                                        ;       ENTRIES MADE IN THE MDBSF,UDBSF,& SSF'S
                                        ;       'LASTER' CONTAINS THE ADDRESS OF THE LAST SECTOR IN ERROR ON
                                        ;         THE TRACK
                                        ;
                                        ;-

000742  012700  177777        VFYSEC: MOV     #-1,R0          ; USE R0 AS THE INDEX INTO 'SECTBL'
000746  005200                1$:     INC     R0              ; INCREMENT THE INDEX
```

```
000750  105760  000144'                TSTB    SECTBL(R0)      ; ENTRY ?
000754  001774                        BEQ     1$              ; IF EQ, NO
000756  010046                2$:     MOV     R0,-(SP)        ; SAVE THE INDEX
000760  010067  000000G               MOV     R0,$SEC         ; RELOAD THE SECTOR ADDRESS
000764  016767  000000G 000000G       MOV     $CYL,$BUF       ; SETUP A SECTOR IMAGE
000772  052767  150000  000000G       BIS     #150000,$BUF    ; SET THE MF, UF, AND FMT16 BITS
001000  116767  000000G 000003G       MOVB    $TRK,$BUF+3     ; LOAD THE TRACK ADDRESS
001006  116767  000000G 000002G       MOVB    $SEC,$BUF+2     ; LOAD THE SECTOR ADDRESS
001014  012705  000000G                3$:     MOV     #$BUF,R5        ; BUFFER ADDRESS
001020  012767  001004  000000G       MOV     #516.,$XFRSZ    ; SECTOR - INCLUDING HEADER BYTE COUNT
001026  004767  000000G               CALL    $CVTDA          ; CONVERT THE PHYSICAL ADDRESS TO LBN
001032  004767  000000G               CALL    $DSKWC          ; WRITE CHECK THE SECTOR
001036  005767  000000G               TST     $RGBUF          ; ANY ERRORS ?
001042  100007                        BPL     4$              ; IF PL, NO
001044  004767  000044               CALL    CKERR           ; PROCESS THE ERROR
001050  103761                        BCS     3$              ; IF CS, NON-DATA ERROR - RETRY
001052  004767  000000G               CALL    $DSTRB          ; PUT THE SECTOR INTO THE PROPER BSF
001056  012600                        MOV     (SP)+,R0        ; RESTORE THE SECTOR TABLE INDEX
001060  000406                        BR      5$              ;
001062  012600                4$:     MOV     (SP)+,R0        ; RESTORE THE SECTOR TABLE POINTER
001064  105360  000144'               DECB    SECTBL(R0)      ; COUNT THE SUCESSFUL RE-READ
001070  100332                        BPL     2$              ; IF PL CONTINUE
001072  105060  000144'               CLRB    SECTBL(R0)      ; CLEAR THE SECTOR ENTRY, ERROR WAS NOT
                                                                ;  REPEATED
001076  016767  000000G 177100  5$:     MOV     $SEC,LASTER     ; ASSUME CURRENT ERROR IS LAST ERROR ON THIS TRACK
001104  005367  177032                DEC     TRKER           ; DECREMENT THE ERROR COUNTER
001110  001316                        BNE     1$              ; IF NE, NOT FINISHED
001112  000207                        RETURN                  ;


                                ;+
                                ; **-CKERR-VERIFY MODULE DEVICE ERROR ANALYSIS ROUTINE
                                ;
                                ; THIS ROUTINE WILL ANALYZE THE DISK ERROR AND REPORT THE ERROR AS REQUIRED.
                                ;
                                ; IF SKI
                                ;     THEN REPORT & RECALIBRATE
                                ;     ELSE REPORT ERROR
                                ;         IF NOT DATA ERROR
                                ;             THEN RETRY UNTIL SUCESSFUL OR RETRY LIMIT EXCEEDED
                                ;             ELSE DETERMINE SECTOR IN ERROR
                                ;                 IF TRACK ERROR COUNT ('TRKER') .EQ 0
                                ;                     THEN LAST ERROR SECTOR ('LASTER') <= ERROR SECTOR
                                ;                 IF ERROR IS HEADER ERROR
                                ;                     THEN ERROR TYPE ('$HDRFG') <= 1
                                ;                     ELSE 'HDRFG' <= 0
                                ;                 IF VERIFY COUNT ('VFYCNT') .NE. 0
                                ;                     THEN IF SECTOR IN ERROR NOT LISTED IN BSF, SSF, OR FEBSF ($SRALL)
                                ;                             THEN LOAD SECTOR RETRY COUNT IN SECTOR ERROR TABLE ('SECTBL')
                                ;                                 'TRKER' = 'TRKER' + 1
                                ;                 TRANSFERRED SECTOR COUNT ('XFRSEC') = ((ERROR SECTOR)-(START SECTOR))-1
                                ;                 IF 'XFRSEC' .NE. 0
                                ;                     THEN END SECTOR <= (ERROR SECTOR-1)
                                ;                         WORD COUNT <= ((END SECTOR)-(START SECTOR +1)+1)*258
                                ;
                                ; INPUTS:
                                ;       $RGBUF - CONTAINS THE RM80 REGISTER CONTENTS
                                ;       VFYCNT - CONTROLS UPDATING 'SECTBL'
```

```
                        ;
                        ; RETURNS:
                        ;       CS - IF THE ERROR WAS A NON DATA ERROR
                        ;
                        ; OUTPUTS:
                        ;       'SECTBL' - UPDATED IF ERROR IS A DATA ERROR AND 'VFYCNT' .NE. 0
                        ;
                        ; NOTE:
                        ;       THIS ROUTINE WILL RETURN TO '$FMTEX' IF THE DRIVE EXCEEDS THE
                        ;        ERROR LIMIT.
                        ;-
                        ;
001114  004767  000000G         CKERR:  CALL    $FLRGS          ; SAVE THE REGISTERS
001120  116746  000006G                 MOVB    $RGBUF+6,-(SP)  ; GET THE SECTOR ADDRESS
001124  005316                  DEC     (SP)            ; BACK UP TO FAILING SECTOR
001126  042716  177740          BIC     #^C37,(SP)      ; JUST IN CASE FAILING SECTOR WAS 31.
001132  016746  000000G         MOV     $RGBUF,-(SP)    ; GET RMCS1
001136  042716  157777          BIC     #^C20000,(SP)   ; LEAVE 'MCPE'
001142  016746  000010G         MOV     $RGBUF+10,-(SP) ; GET RMCS2
001146  042716  040000          BIC     #40000,(SP)     ; CLEAR 'WCE'
001152  156666  000001  000002  BISB    1(SP),2(SP)     ; 'OR' THE ERROR BITS FROM RMCS2
001160  016716  000042G         MOV     $RGBUF+42,(SP)  ; GET RMER2
001164  042716  100000          BIC     #100000,(SP)    ; CLEAR 'BSE'
001170  052616                  BIS     (SP)+,(SP)      ; 'OR' WITH 'MCPE' & RMCS2 ERROR BITS
001172  005726                  TST     (SP)+           ; SEE IF ANY ERROR BITS SET
001174  001012                  BNE     1$              ; IF NE, YES - NON DATA ERROR
001176  032767  110400  000014G BIT     #110400,$RGBUF+14       ; TEST 'DCK!DTE!HCRC'
001204  001052                  BNE     4$              ; IF NE, MUST BE A DATA OR HEADER ERROR
001206  016746  000014G         MOV     $RGBUF+14,-(SP) ; COPY RMER1
001212  042716  110400          BIC     #110400,(SP)    ; CLEAR THE DATA/HEADER ERROR BITS
001216  005726                  TST     (SP)+           ; SEE IF ANY OTHER ERROR BITS ARE SET
001220  001506                  BEQ     6$              ; IF EQ, NO - ERROR MUST BE A 'BSE'

                        ; SEND ERROR MESSAGE

001222  012700  000023'  1$:     MOV     #MSG3V,R0       ; 'NON DATA ERROR DURING VERIFY'
001226  012701  000060          MOV     #60,R1          ; CARRIAGE CONTROL CHARACTER
001232  004767  000000G         CALL    $PRNTO          ; SEND MESSAGE
001236  004767  000000G         CALL    $MGPRE          ; TYPE THE DEVICE REGISTERS
001242  105367  000000G         DECB    $SWERL          ; SEE IF ERROR LIMIT EXCEEDED
001246  001014                  BNE     2$              ; IF NE, NO
001250  012700  000000G         MOV     #$MSG45,R0      ; 'ERROR LIMIT EXCEEDED'
001254  012701  000060          MOV     #60,R1          ; CARRIAGE CONTROL CHARACTER
001260  004767  000000G         CALL    $PRNTO          ; SEND MESSAGE
001264  012700  000000'         MOV     #MSG2V,R0       ; 'VERIFY TERMINATING'
001270  004767  000000G         CALL    $PRINT          ; PRINT THE MESSAGE
001274  000167  000000G         JMP     $FMTEX          ; ABORT THE FORMATTER
001300  012700  000060'  2$:     MOV     #MSG4V,R0       ; 'VERIFY CONTINUING'
001304  004767  000000G         CALL    $PRINT          ; SEND MESSAGE
001310  032767  040000  000042G BIT     #40000,$RGBUF+42        ; SEE IF 'SKI'
001316  001402                  BEQ     3$              ; IF EQ, NO
001320  004767  000000G         CALL    $HOMSK          ; DO A RECAL
001324  005726                  TST     (SP)+           ; CORRECT THE STACK
001326  000261          3$:     SEC                     ; SHOW NON-DATA ERROR
001330  000207                  RETURN                  ;
```

```
                                ; THE ERROR IS A DATA ERROR, PROCESS AND EXIT
                                ;
001332  105067  000000G        4$:     CLRB    $HDRFG          ; ASSUME DATA ERROR
001336  032767  000400  000014G        BIT     #400,$RGBUF+14  ; SEE IF ERROR IS A HEADER ERROR ('HCRC')
001344  001402                        BEQ     5$              ; IF EQ, DATA ERROR
001346  105267  000000G              INCB    $HDRFG          ; SET HEADER ERROR FLAG
001352  005767  176636        5$:     TST     VFYCNT          ; SEE IF VERIFING THE ENTIRE TRACK OR IF PROCESSING A
                                                              ;  SINGLE SECTOR
001356  001457                        BEQ     9$              ; IF EQ, VERIFYING SINGLE SECTORS
001360  011667  000000G              MOV     (SP),$SEC       ; PUT THE BAD SECTOR ADDRESS IN '$SEC'
001364  004767  000000G              CALL    $SRALL          ; SEE IF THE ERROR IS LISTED IN ONE OF THE BAD SECTOR
                                                              ;  FILES
001370  103022                        BCC     6$              ; IF CC, DEFECT IS ALREADY ACCOUNTED FOR
001372  005267  176544              INC     TRKER           ; INCREMENT THE TRACK ERROR COUNT
001376  011600                      MOV     (SP),R0         ; GET THE BAD SECTOR ADDRESS
001400  116760  000000G 000144'      MOVB    $RETRY,SECTBL(R0)       ; LOAD RETRY COUNT AND FLAG A BAD SECTOR
001406  012700  000102'              MOV     #MSG5V,R0       ; 'HEADER/DATA ERROR DURING VERIFY
001412  012701  000060              MOV     #60,R1          ; CARRIAGE CONTROL CHARACTER
001416  004767  000000G              CALL    $PRNTO          ; SEND MESSAGE
001422  004767  000000G              CALL    $MGPRE          ; TYPE THE DEVICE REGISTERS
001426  012700  000060'              MOV     #MSG4V,R0       ; 'VERIFY CONTINUING'
001432  004767  000000G              CALL    $PRINT          ; PRINT IT
001436  011667  176544        6$:     MOV     (SP),XFRSEC     ; COPY THE ADDRESS OF THE ERROR SECTOR
001442  166767  176544  176536        SUB     BEGSEC,XFRSEC   ; CALCULATE THE NUMBER OF SECTORS TRANSFERED
001450  001003                        BNE     7$              ; IF NE, AT LEAST ONE SECTOR TRANSFERED
001452  005267  176534              INC     BEGSEC          ; STEP AROUND THE ERROR SECTOR
001456  000404                        BR      8$
001460  011667  176524        7$:     MOV     (SP),ENDSEC     ; CHANGE THE ENDING SECTOR ADDRESS
001464  005367  176520              DEC     ENDSEC          ; POINT TO LAST ERROR FREE SECTOR
001470  016700  176514        8$:     MOV     ENDSEC,R0       ; COPY THE ENDING SECTOR
001474  166700  176512              SUB     BEGSEC,R0       ; CALCULATE THE NEW BYTE COUNT
001500  005200                      INC     R0              ; CORRECT THE DIFFERENCE
001502  012701  001004              MOV     #516.,R1        ; NUMBER BYTES/SECTOR
001506  004767  000000G              CALL    $MULT           ; MULTIPLY THE SECTORS * SIZE
001512  010167  000000G              MOV     R1,$XFRSZ       ; UPDATE THE BYTE COUNT
001516  005726                9$:     TST     (SP)+           ; CORRECT THE STACK
001520  000241                        CLC                     ; SET THE DATA ERROR INDICATOR
001522  000207                        RETURN                  ;

        000001                .END
```

SYMBOL TABLE

```
BEGSEC  000212R          SKPFRE= ****** GX       $FLRGS= ****** GX       $PHYDV= ****** GX       $SWERL= ****** GX
CKERR   001114R          TRKER   000142R         $FMTEX= ****** GX       $PRINT= ****** GX       $SWFFE= ****** GX
ENDSEC  000210R          VFYCNT  000214R         $HDRFG= ****** GX       $PRNTO= ****** GX       $TRK  = ****** GX
GENHDR= ****** GX        VFYSEC  000742R         $HOMSK= ****** GX       $RETRY= ****** GX       $TSTMX= ****** GX
LASTER  000204R          XFRSEC  000206R         $MGPRE= ****** GX       $RGBUF= ****** GX       $UPDMX= ****** GX
MSG2V   000000R          $BUF  = ****** GX       $MSG11= ****** GX       $RM80V  000216RG        $VERIF= ****** GX
MSG3V   000023R          $CVTDA= ****** GX       $MSG45= ****** GX       $R80SF= ****** GX       $WTBSF= ****** GX
MSG4V   000060R          $CYL  = ****** GX       $MULT = ****** GX       $R80TF= ****** GX       $WTSSF= ****** GX
MSG5V   000102R          $DSKWC= ****** GX       $MVPAT= ****** GX       $SEC  = ****** GX       $XFRSZ= ****** GX
SECTBL  000144R          $DSTRB= ****** GX       $MXSEC= ****** GX       $SRALL= ****** GX

. ABS.  000000     000
        001524     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  577 WORDS  ( 3 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:15
[300,20]FMTR8V,[300,30]FMTR8V=[300,10]FMTR8V
```

```
                        .TITLE  FMTR8M - DEFECT ENTRY MODULE
                        .IDENT  /01.00/
                        ;
                        ;
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                        ;
                        ;
                        ;  VERSION 01.00
                        ;
                        ; C. HESS        18-AUG-80
                        ; M. LEAVITT     14-JAN-81
                        ;
                        ;
                        ;
                        ; MESSAGES
                        ;
                        .NLIST  BEX
000000      125     104     102 MSG1R8: .ASCIZ  /UDBSF /
000007      115     123     102 MSG2R8: .ASCIZ  /MSBSF/
000015      123     123     106 MSG3R8: .ASCIZ  /SSF/
000021      106     105     040 MSG4R8: .ASCIZ  /FE BAD SECTORS/
000040      104     125     120 MSG7R8: .ASCIZ  /DUPLICATE ENTRY - /
000063      106     111     114 MSG8R8: .ASCIZ  /FILE FULL - /
000100      105     116     124 MSGCR8: .ASCIZ  /ENTER BAD SECTR ADRS:/
000126      103     131     114 MSGDR8: .ASCIZ  /CYL,TRK,SEC = /
000145      110     104     101 MSGER8::.ASCIZ  @HDA S/N DOESN'T MATCH CURRENT S/N@
                        .EVEN
                        ; LBN CONSTANTS
000210  000003  151200 FELBN:  .WORD   3,151200        ; BEGINNING OF THE FE CYLINDERS
                                                      ; (559.,2,0)
000214  000003  151040 USRLBN: .WORD   3,151040        ; END OF USER SPACE
                                                      ; (558..12.,31.)
                        ; MINIMUM/MAXIMUM STORAGE FOR INPUT ROUTINE
000220  000000        MINCYL: .WORD   0               ;STORE MIN. CYLINDER ADDRESS HERE
```

```
     58 000222  000000                MINTRK: .WORD   0               ;        ''   TRACK       ''
     59 000224  000000                MAXCYL: .WORD   0               ;STORE MAX. CYLINDER ADDRESS HERE
     60 000226  000000                MAXTRK: .WORD   0               ;        ''   TRACK       ''
     61
```

```
                        ;+
                        ; **-$RM80M-MANUAL INPUT OF UDBSF OR SSF DATA
                        ;
                        ; THIS ROUTINE WILL ACCEPT MANUALLY INPUTTED DATA FOR EITHER THE
                        ; UDBSF OR SSF FILES AND RE-WRITE THESE FILES TO THE RM80 DISK.
                        ;
                        ; INPUTS:
                        ;       NONE
                        ;
                        ; OUTPUTS:
                        ;       RE-WRITTEN UDBSF OR SSF
                        ;
                        ;-
000230  004767  000000G $RM80M::CALL    $RDSSF          ; READ SKIP SECTOR FILE
000234  004767  000000G         CALL    $RDBSF          ; READ THE MDBSF & UDBSF
000240  012701  000060          MOV     #60,R1          ; SET 2 LINE FEED CONTROL
000244  012700  000100'         MOV     #MSGCR8,R0      ; GET ADDRESS OF MESSAGE
000250  004767  000000G         CALL    $PRNTO          ; PRINT 'ENTER BAD SECTR ADRS:'
                        ;
000254  004767  000554  1$:     CALL    INPUT           ; GET SSF ENTRIES
000260  001403                  BEQ     2$              ; IF EQ, FINISHED
000262  004767  000024          CALL    $DSTRB          ; DISTRIBUTE ENTERED ADDRESS INTO CORRECT FILE
000266  000772                  BR      1$              ; CONTINUE
                        ;
000270  004767  000000G 2$:     CALL    $R80SF          ; FORMAT THE BSF/SSF TRACKS
000274  004767  000000G         CALL    $WTSSF          ; RE-WRITE THE SSF
000300  004767  000000G         CALL    $WTBSF          ; RE-WRITE THE BSF
000304  105067  000000G         CLRB    $SWMOD          ; CLEAR THE MODIFY FLAG
000310  000207                  RETURN
                        ;
                        ;+
                        ; **-$DSTRB-ROUTINE WILL DISTRIBUTE THE DEFECT ADDRESSES
                        ;
                        ; THIS ROUTINE DISTRIBUTES THE OPERATOR ENTERED ADDRESS TO THE CORRECT
                        ;  DEFECT FILE AND CHECKS FOR DUPLICATION IN THE SSF.
                        ;
                        ; INPUTS:
                        ;       $CYL = OPERATOR ENTERED CYLINDER ADDRESS
                        ;       $TRK = OPERATOR ENTERED TRACK ADDRESS
                        ;       $SEC = OPERATOR ENTERED SECTOR ADDRESS
                        ;       $HDRFG = 1  IF DEFECT IS A HEADER DEFECT
                        ;
                        ; OUTPUTS:
                        ;       NONE
                        ;-
000312  105067  000000G $DSTRB::CLRB    SKPFRE          ; CLEAR THE SKIP SECTOR FLAG
000316  004767  000000G         CALL    $SRSDF          ; SEE IF ENTRY IN THE SSF
000322  103405                  BCS     1$              ; IF CS, NO
000324  012704  000015'         MOV     #MSG3R8,R4      ; DUPLICATE ENTRY MESSAGE
000330  004767  000410          CALL    DUP             ; TYPE THE MESSAGE
000334  000556                  BR      13$             ; TRY AGAIN
000336  105767  000000G 1$:     TSTB    $HDRFG          ; SEE IF DEFECT IS A HEADER DEFECT
000342  001041                  BNE     4$              ; IF NE, IT IS
000344  012701  000000C         MOV     #$SSF+<2*$SSFHD>-4,R1   ; SSF ADDRESS
000350  012702  000000C         MOV     #$SSF+<1000*$SSFLN>-2,R2        ; SSF LENGTH
```

```
                                        CALL    $SRTRK          ; SEARCH THE SSF
                                        BCC     4$              ; IF CC, TRACK IS IN THE SSF
                                        CMP     R1,#$SSF+<1000*$SSFLN>-2        ; IS SSF FULL?
                                        BNE     2$              ; IF NE NO
                                        MOV     #MSG3R8,R4      ; GET SSF MESSAGE
                                        CALL    FULL            ; ISSUE FILE FULL MESSAGE
                                        BR      13$             ; GET NEXT ENTRY

                                ; LOAD SSF WITH NEW BAD SECTOR ADDRESS, REVISION DATE, REVISION NUMBER
                                ; AND UPDATED ENTRY NUMBER

                                2$:     MOV     $CYL,(R1)+      ; PUT CYLINDER ADDRESS INTO SSF
                                        MOVB    $SEC,(R1)+      ; PUT SECTOR ADDRESS INTO SSF
                                        MOVB    $TRK,(R1)+      ; PUT TRACK ADDRESS INTO SSF
                                        MOV     DPARS,$SSF+6    ; LOAD SSF REVISION DATE IN TABLE
                                        CMP     $REVNM,$SSF+10  ; HAS REVISION NUMBER BEEN UPDATED YET ?
                                        BNE     3$              ; BR IF YES
                                        INC     $SSF+10         ; UPDATE REVISION NUMBER
                                3$:     INC     $SSF+22         ; INCREMENT NUMBER OF ENTRIES
                                        BR      13$             ; CONTINUE

                                ; SEE IF THE DEFECT CAN GO INTO THE UDBSF OR FEBSF

                                4$:     CALL    $SRSSF          ; SEE IF ENTERED SECTOR IS WITHIN A SKIP REGION
                                        BCS     5$              ; IF CS, NC
                                        DECB    $SEC            ; DECREMENT THE SECTOR ADDRESS
                                        INCB    SKPFRE          ; SHOW SECTOR WITHIN A SKIP REGION
                                5$:     MOV     #MSG2R8,R4      ; ASSUME DUPLICATE MDBSF ENTRY
                                        CALL    $SRMDF          ; SEARCH THE MDBSF
                                        BCC     6$              ; IF CC, ENTRY DUPLICATED
                                        MOV     #MSG4R8,R4      ; ASSUME DUPLICATE ENTRY
                                        CALL    $SRFES          ; SEE IF ENTRY DUPLICATED IN THE FE AREA
                                        BCC     6$              ; IF CC, ENTRY DUPLICATED
                                        MOV     #MSG1R8,R4      ; ASSUME DUPLICATE UDBSF
                                        CALL    $SRUDF          ; SEARCH THE UDBSF
                                        BCS     7$              ; IF CS, ENTRY NOT DUPLICATED
                                6$:     TSTB    SKPFRE          ; SEE IF IN A SKIP REGION
                                        BNE     12$             ; IF NE, YES
                                        CALL    DUP             ; REPORT IT
                                        BR      13$             ; GET ANOTHER ENTRY
                                7$:     CALL    CKUSR           ; SEE IF ENTRY IF FOR THE USER ADDRESSES
                                        BCC     9$              ; IF CC, YES
                                        CALL    CHKFE           ; SEE IF ENTRY IS FOR FE CYLINDERS
                                        BCC     8$              ; IF CC, YES
                                        MOV     #$MSG32,R0      ; 'INVALID ENTRY'
                                        CALL    $PRINT          ; PRINT THE MESSAGE
                                        BR      13$             ;
                                8$:     CALL    $SRFES          ; LOCATE WHERE TO PUT THE ENTRY
                                        MOV     #MSG4R8,R4      ; FE BSF MESSAGE SUFFIX
                                        CMP     R1,#$FEBSF+64.  ; IF THE FE BSF FULL ?
                                        BNE     11$             ; IF NE, NO
                                        BR      10$             ; REPORT FILE FULL
                                9$:     CALL    $SRUDF          ; LOCATE LAST ENTRY IN THE UDBSF
                                        CMP     R1,#$UDBSF+1000-4       ; IS UDBSF FULL?
                                        BNE     11$             ; IF NE, NO
                                        MOV     #MSG1R8,R4      ; UDBSF MESSAGE SUFFIX
                                10$:    CALL    FULL            ; ISSUE FILE FULL MESSAGE
```

```
                        000421                          BR      13$             ; TRY AGAIN
                        016721  000000G         11$:    MOV     $CYL,(R1)+      ; PUT CYLINDER ADDRESS INTO UDBSF
                        116721  000000G                 MOVB    $SEC,(R1)+      ; PUT SECTOR ADDRESS INTO UDBSF
                        116721  000000G                 MOVB    $TRK,(R1)+      ; PUT TRACK ADDRESS INTO UDBSF
                        105767  000000G                 TSTB    SKPFRE          ; SEE IF SECTOR WITHIN A SKIP REGION
                        001410                          BEQ     13$             ; IF EQ, NO
                        105767  000000G         12$:    TSTB    $HDRFG          ; WAS ENTRY FOR A HEADER DEFECT ?
                        001405                          BEQ     13$             ; IF EQ, NO - GET NEXT ENTRY
                        105067  000000G                 CLRB    $HDRFG          ; CLEAR THE HEADER DEFECT FLAG
                        105267  000000G                 INCB    $SEC            ; INCREMENT SECTOR ADDRESS
                        000675                          BR      5$              ; CONTINUE
                        000207                  13$:    RETURN                  ;

                                                        ;+
                                                        ; **-CHKFE-SEE IF THE DEFECT ADDRESS ENTRY IS FOR THE FE CYLINDERS
                                                        ;
                                                        ; INPUTS:
                                                        ;       $CYL,$TRK,$SEC LOADED
                                                        ;
                                                        ; RETURNS:
                                                        ;       CS      ENTRY IS NOT FOR THE FE CYLINDERS
                                                        ;       CC      ENTRY IS FOR FE CYLINDERS
                                                        ;-

                        004767  000000G         CHKFE:  CALL    $CVTDA          ; CONVERT THE PHYSICAL ADDRESS TO AN LBN
                        026767  000000G 177302          CMP     $LBNH,FELBN     ; CHECK HIGH LBN
                        103403                          BLO     1$              ; IF LO, DON'T LOOK ANY MORE
                        026767  000000G 177274          CMP     $LBNL,FELBN+2   ; CHECK THE LOW LBN
                        000207                  1$:     RETURN                  ;

                                                        ;+
                                                        ; **-CKUSR-SEE IF THE DEFECT ADDRESS ENTRY IS FOR THE USER CYLINDERS
                                                        ;
                                                        ; INPUTS:
                                                        ;       $CYL,$TRK,$SEC LOADED
                                                        ;
                                                        ; RETURNS:
                                                        ;       CS      ENTRY IS NOT FOR THE USER CYLINDERS
                                                        ;       CC      ENTRY IS FOR USER CYLINDERS
                                                        ;-

                        004767  000000G         CKUSR:  CALL    $CVTDA          ; CONVERT THE PHYSICAL ADDRESS TO AN LBN
                        026767  177264  000000G         CMP     USRLBN,$LBNH    ; CHECK HIGH LBN
                        103403                          BLO     1$              ; IF LO, DON'T LOOK ANY MORE
                        026767  177256  000000G         CMP     USRLBN+2,$LBNL  ; CHECK THE LOW LBN
                        000207                  1$:     RETURN                  ;

                                                        ;+
                                                        ; **-DUP-DUP ROUTINE WILL ISSUE THE DUPLICATE ENTRY MEESAGE FOR SPECIFIED FILE
                                                        ;
                                                        ; THIS ROUTINE WILL ISSUE THE DUPLICATE ENTRY MESSAGE FOR THE SPECIFIED FILE
                                                        ;
                                                        ; INPUTS:
                                                        ;       R4 = ADDRESS OF SPECIFIED FILE MESSAGE
                                                        ;
                                                        ; OUTPUTS:
                                                        ;       NONE
```

```
                                        ;
                                        ;-
                                        ;
000744  012703  000040'        DUP:    MOV     #MSG7R8,R3      ;GET DUPLICATE ENTRY MESSAGE
000750  012700  000000G                MOV     #$BUFRX,R0      ;GET ADDRESS OF OUTPUT BUFFER
000754  004767  000000G                CALL    $MOVE           ;PUT MESSAGE IN OUTPUT BUFFER
000760  010403                        MOV     R4,R3           ;GET ADDRESS OF SPECIFIED FILE
000762  004767  000000G                CALL    $MOVE           ;PUT THAT IN OUTPUT BUFFER
000766  012700  000000G                MOV     #$BUFRX,R0      ;GET ADDRESS OF MESSAGE BUFFER
000772  004767  000000G                CALL    $PRINT          ;PRINT IT
000776  000207                        RETURN                  ;
                                        ;+
                                        ; **-FULL-FULL ROUTINE WILL ISSUE THE FILE FULL MESSAGE FOR SPECIFIED FILE
                                        ;
                                        ; INPUTS:
                                        ;       R4 = ADDRESS OF FILE NAME MESSAGE
                                        ;
                                        ; OUTPUTS:
                                        ;       NONE
                                        ;
                                        ;-
001000  012703  000063'        FULL:   MOV     #MSG8R8,R3      ;GET FILE FULL MESSAGE
001004  012700  000000G                MOV     #$BUFRX,R0      ;GET ADDRESS OF OUTPUT BUFFER
001010  004767  000000G                CALL    $MOVE           ;PUT MESSAGE IN OUTPUT BUFFER
001014  010403                        MOV     R4,R3           ;GET ADDRESS OF FILE NAME MESSAGE
001016  004767  000000G                CALL    $MOVE           ;PUT THAT IN OUTPUT BUFFER
001022  012700  000000G                MOV     #$BUFRX,R0      ;GET ADDRESS OF MESSAGE BUFFER
001026  004767  000000G                CALL    $PRINT          ;PRINT IT
001032  000207                        RETURN                  ;
                                        ;+
                                        ; **-INPUT-INPUT DATA FOR SPECIFIED FILE
                                        ;
                                        ; THIS ROUTINE WILL PROMPT THE USER FOR THE DESIRED CYLINDER, TRACK, AND SECTOR
                                        ; ADDRESS.
                                        ;
                                        ; INPUTS:
                                        ;       NONE
                                        ;
                                        ; OUTPUTS:
                                        ;       $CYL, $TRK, AND $SEC SET TO SPECIFIED VALUES
                                        ;       $HDRFG = 1 IF THE ENTRY HAD AN 'H' SUFFIX
                                        ;       IF Z = 1        NO MORE DATA TO INPUT
                                        ;       IF Z = 0        MORE DATA TO INPUT
                                        ;
                                        ;-
001034  105067  000000G        INPUT:  CLRB    $HDRFG          ; CLEAR THE HEADER FLAG
001040  012703  000000G                MOV     #$PHYDV,R3      ; POINTER TO PHYSICAL DEVICE GEOMETRY
001044  004767  000000G                CALL    $UPDMX          ; UPDATE MAX VALUES
001050  012700  000126'        1$:     MOV     #MSGDR8,R0      ; OPERATOR PROMPT
001054  004767  000000G                CALL    $PRMPT          ; GET INPUT FROM THE USER
001060  001001                        BNE     2$              ; IF NE, INPUT FROM USER
001062  000207                        RETURN                  ;
```

```
                                2$:     CALL    LDLMTS          ; INITIALIZE DISK ADDRESS LIMITS
                                        MOV     #$BUFRX,R0      ; BUFFER POINTER
                                        CMPB    #'#,(R0)        ; SEE IF OCTAL INPUT
                                        BEQ     4$              ; IF EQ, ERROR
                                        CALL    $CDTB           ; CONVERT THE CYLINDER ADDRESS
                                        CMPB    #',,R2          ; CHECK PROPER SEPARATOR
                                        BNE     4$              ; IF NE, ERROR
                                        CALL    LDLMTS          ; LOAD NEW TRACK ADDRESS LIMITS
                                        CMP     R1,MAXCYL       ; LOOK FOR VALID CYLINDER ADDRESS
                                        BHI     4$              ; IF HI, INVALID CYLINDER ADDRESS
                                        CMP     R1,MINCYL       ; LOOK FOR VALID CYLINDER ADDRESS
                                        BLT     4$              ; IF LT, INVALID CYLINDER ADDRESS
                                        MOV     R1,$CYL         ; LOAD THE CYLINDER ADDRESS

                                        CALL    $CDTB           ; CONVERT THE TRACK ADDRESS
                                        CMPB    #',,R2          ; CHECK FOR PROPER SEPARATOR
                                        BNE     4$              ; IF NE, ERROR
                                        CMP     R1,MAXTRK       ; LOOK FOR VALID TRACK ADDRESS
                                        BHI     4$              ; IF HI, INVALID TRACK  ADDRESS
                                        CMP     R1,MINTRK       ; LOOK FOR VALID TRACK ADDRESS
                                        BLT     4$              ; IF LT, INVALID TRACK  ADDRESS
                                        MOV     R1,$TRK         ; LOAD THE TRACK ADDRESS

                                        CALL    $CDTB           ; CONVERT THE SECTOR ADDRESS
                                        CMP     R1,#31.         ; LOOK FOR VALID SECTOR ADDRESS
                                        BHI     4$              ; IF HI, INVALID SECTOR  ADDRESS
                                        MOV     R1,$SEC         ; LOAD THE SECTOR ADDRESS
                                        CMPB    #'H,R2          ; HEADER ERROR ADDRESS ?
                                        BNE     3$              ; IF NE, NO
                                        INCB    $HDRFG          ; SET THE HEADER ERROR FLAG
                                3$:     CLZ                     ; SHOW MORE INPUT
                                        RETURN                  ; EXIT
                                4$:     MOV     #$MSG32,R0      ; INVALID RESPONSE
                                        CALL    $PRINT          ; TYPE THE MESSAGE
                                        BR      1$              ; CONTINUE

                                ;+
                                ; **-LDLMTS-LOAD LIMITS
                                ;
                                ; THIS ROUTINE LOADS THE MINIMUM AND MAXIMUM DISK ADDRESS LIMITS
                                ; USED BY THE 'INPUT' SUBROUTINE.
                                ;
                                ;-

                                LDLMTS: CLR     MINCYL          ; ASSUME MIN. CYLINDER= 0.
                                        CLR     MINTRK          ;         "     TRACK= 0.
                                        MOV     #560.,MAXCYL    ; ASSUME MAX. CYLINDER= 560.
                                        MOV     #13.,MAXTRK     ;         "     TRACK= 13.
                                        TSTB    $SWFFE          ; FORMATTING FE CYLINDERS ONLY ?
                                        BEQ     1$              ; BR IF NO
                                        MOV     #558.,MINCYL    ; MIN. CYLINDER= 558.
                                        CMP     R1,#558.        ; IS CYLINDER INPUT 558. ?
                                        BNE     1$              ; BR IF NO
                                        MOV     #13.,MINTRK     ; MIN. TRACK= 13.
                                1$:     RETURN

                                        000001                  .END
```

SYMBOL TABLE

```
CHKFE   000674R          MSGCR8  000100R          $CDTB = ****** GX        $PRMPT= ****** GX        $SRTRK= ****** GX
CKUSR   000720R          MSGDR8  000126R          $CVTDA= ****** GX        $PRNTO= ****** GX        $SRUDF= ****** GX
DPARS = ****** GX        MSGER8  000145RG         $CYL  = ****** GX        $RDBSF= ****** GX        $SSF  = ****** GX
DUF     000744R          MSG1R8  000000R          $DSTRB  000312RG         $RDSSF= ****** GX        $SSFMD= ****** GX
FELBN   000210R          MSG2R8  000007R          $FEBSF= ****** GX        $REVNM= ****** GX        $SSFLN= ****** GX
FULL    001000R          MSG3R8  000015R          $HDRFG= ****** GX        $RM80M  000230RG         $SWFFE= ****** GX
INPUT   001034R          MSG4R8  000021R          $LBNH = ****** GX        $R80SF= ****** GX        $SWMOD= ****** GX
LDLMTS  001240R          MSG7R8  000040R          $LBNL = ****** GX        $SEC  = ****** GX        $TRK  = ****** GX
MAXCYL  000224R          MSG8R8  000063R          $MOVE = ****** GX        $SRFES= ****** GX        $UDBSF= ****** GX
MAXTRK  000226R          SKPFRE= ****** GX        $MSG32= ****** GX        $SRMDF= ****** GX        $UPDMX= ****** GX
MINCYL  000220R          USRLBN  000214R          $PHYDV= ****** GX        $SRSDF= ****** GX        $WTBSF= ****** GX
MINTRK  000222R          $BUFRX= ****** GX        $PRINT= ****** GX        $SRSSF= ****** GX        $WTSSF= ****** GX

. ABS.  000000      000
        001316      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  602 WORDS  ( 3 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:13
[300,20]FMTR8M,[300,30]FMTR8M=[300,10]FMTR8M
```

```
                        .TITLE  FMTR8L - DISPLAY BAD SECTOR FILE CONTENTS
                        .IDENT  /01.00/
                        ;
                        ;
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                        ;
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                        ;
                        ;
                        ;  VERSION 01.00
                        ;
                        ; C. HESS       9-JUL-80
                        ; M. LEAVITT    22-OCT-80
                        ;
                        .NLIST  BEX
                        .ASCIZ  /SSF (SKIPPED SECTOR FILE) CONTENTS/
                        .ASCIZ  /MDBSF CONTENTS/
                        .ASCIZ  /UDBSF CONTENTS/
                        .ASCIZ  @CREATION DATE: @
                        .ASCIZ  @HDA S/N: @
                        .ASCIZ  /CYL,TRK,SEC/
                        .ASCIZ  /* INVALID DATE */
                        .ASCIZ  /* NO ENTRIES */
                        .ASCIZ  /REVISION DATE: /
                        .ASCIZ  /REVISION NUMBER: /
                        .ASCIZ  /MDBSF 'LOGICAL' CONTENTS/
                        .ASCIZ  /UDBSF 'LOGICAL' CONTENTS/
                        .ASCIZ  / /
                        SSFLST: .BYTE   0               ; LIST SSF SWITCH
                        .EVEN
                        DPARS:  .BLKW   10.             ; OUTPUT CONVERSION BUFFER
```

```
                                ;+
                                ; **-$RM80L-DISPLAY THE CONTENTS OF THE MDBSF, UDBSF, AND SSF
                                ;
                                ; THIS ROUTINE WILL DISPLAY THE CONTENTS OF THE MDBSF, THE UDBSF
                                ; AND THE SSF FILES.
                                ;
                                ; INPUTS:
                                ;       NONE
                                ;
                                ; OUTPUTS:
                                ;       THE CONTENTS OF THE MDBSF, UDBSF, AND SSF PRINTED ON 'TI:'
                                ;       '$SWLST' CLEARED
                                ;-
                                .ENABL  LSB
                                $RM80L::CALL    $RDSSF          ; READ THE SKIPPED SECTOR FILE (SSF)
                                        CALL    $RDBSF          ; READ THE MDBSF AND THE UDBSF
                                ; DISPLAY THE SSF CONTENTS
                                        MOV     #MSG1L,R0       ; 'SSF (SKIPPED SECTOR FILE) CONTENTS'
                                        MOV     #60,R1          ; CARRIAGE CONTROL CHARACTER
                                        CALL    $PRNTO          ;
                                        MOV     #$SSF,R1        ; SERIAL NUMBER POINTER
                                        CALL    HDASN           ; PRINT THE HDA SERIAL NUMBER
                                        MOV     #$BUFRX,R0      ; BUFFER POINTER
                                        MOV     #MSG4L,R3       ; 'CREATION DATE: '
                                        CALL    $MOVE           ; LOAD THE BUFFER
                                        MOV     #$SSF+4,R3      ; DATE FIELD POINTER
                                        CALL    SFDATE          ; PRINT THE SSF DATE FIELDS
                                        MOV     #$BUFRX,R0      ; BUFFER POINTER
                                        MOV     #MSG9L,R3       ; 'REVISION DATE: '
                                        CALL    $MOVE           ; LOAD THE BUFFER
                                        MOV     #$SSF+6,R3      ; DATE FIELD POINTER
                                        CALL    SFDATE          ; PRINT THE SSF DATE FIELDS
                                        MOV     #$BUFRX,R0      ; BUFFER POINTER
                                        MOV     #MSG10L,R3      ; 'REVISION NUMBER: '
                                        CALL    $MOVE           ; LOAD THE BUFFER
                                        MOV     $SSF+10,R1      ; REVISION NUMBER
                                        CLR     R2              ; ENABLE ZERO SUPRESSION
                                        CALL    $CBDMG          ; CONVERT
                                        CLRB    (R0)            ; ASCIZ TERMINATOR
                                        MOV     #$BUFRX,R0      ; OUTPUT POINTER
                                        CALL    $PRINT          ;
                                        MOV     #$SSF+<2*$SSFHD>,R3     ; BEGINNING OF SSF DATA FIELD
                                        MOVB    #-1,SSFLST      ; SET SSF LIST FLAG
                                        CALL    BSFDAT          ; PRINT THE SSF FILE CONTENTS
                                        CLRB    SSFLST          ; RESET THE SSF LIST FLAG
                                ; DISPLAY THE MDBSF CONTENTS
                                        MOV     #MSG2L,R0       ; 'MDBSF CONTENTS'
                                        TSTB    $SWLOG          ; SEE IF LOGICAL DISPLAY
                                        BEQ     10$             ; IF EQ, NO
                                        MOV     #MSG11L,R0      ; CHANGE TO 'MDBSF LOGICAL CONTENTS'
                                10$:    MOV     #60,R1          ; CARRIAGE CONTROL CHARACTER
```

```
                                        CALL    $PRNTO          ;
                                        MOV     #$MDBSF,R1      ; MDBSF S/N POINTER
                                        CALL    HDASN           ; TYPE THE SERIAL NUMBER
                                        MOV     #$MDBSF+10,R3   ; MDBSF DATA POINTER
                                        CALL    BSFDAT          ; DISPLAY THE MDBSF

                                ; DISPLAY THE UDBSF CONTENTS

                                        MOV     #MSG3L,R0       ; 'UDBSF CONTENTS'
                                        TSTB    $SWLOG          ; SEE IF LOGICAL DISPLAY
                                        BEQ     20$             ; IF EQ, NO
                                        MOV     #MSG12L,R0      ; CHANGE TO 'UDBSF LOGICAL CONTENTS'
                                20$:    MOV     #60,R1          ; CARRIAGE CONTROL CHARACTER
                                        CALL    $PRNTO          ;
                                        MOV     #$UDBSF,R1      ; UDBSF S/N POINTER
                                        CALL    HDASN           ; TYPE THE SERIAL NUMBER
                                        MOV     #$UDBSF+10,R3   ; UDBSF DATA POINTER
                                        CALL    BSFDAT          ; DISPLAY THE UDBSF
                                        MOV     #SPACE,R0       ; BLANK LINE
                                        CALL    $PRINT          ; PRINT THE LINE
                                        CLRB    $SWLST          ; CLEAR THE 'LIST' FLAG
                                        RETURN                  ;

                                .DSABL  LSB

                                ;+
                                ; **-SFDATE-DISPLAY THE SSF DATE FIELD CONTENTS
                                ;
                                ; THIS ROUTINE PRINTS THE CREATION AND REVISION DATE FIELDS
                                ; FROM THE SSF
                                ;
                                ; INPUT:
                                ;       R0 = BUFFER POINTER
                                ;       R3 = DATE FIELD POINTER
                                ;
                                ; OUTPUT:
                                ;       NONE
                                ;-

                                SFDATE: MOV     (R3),R1         ; DATE
                                        BIC     #^C740,R1       ; LEAVE MONTH CODE
                                        TST     R1              ; LOOK FOR VALID MONTH
                                        BEQ     10$             ; IF EQ, MONTH CODE OF ZERO
                                        CMP     R1,#12.         ; CHECK MONTH UPPER LIMIT
                                        BHI     10$             ; IF HI, MONTH CODE ERROR
                                        MOV     R1,DPARS+2      ; MOVE MONTH
                                        MOV     (R3),R1         ; GET THE DATE AGAIN
                                        BIC     #^C37,R1        ; LEAVE THE DAY CODE
                                        CMP     R1,#31.         ; CHECK VALIDITY
                                        BHI     10$             ; IF HI, INVALID DAY
                                        MOV     R1,DPARS+4      ; MOVE DAY
                                        MOVB    1(R3),R1        ; GET THE YEAR CODE
                                        ASR     R1              ; RIGHT JUSTIFY
                                        ADD     #BASYR,R1       ; ADD THE BASE YEAR
                                        MOV     R1,DPARS        ; YEAR
                                        MOV     #DPARS,R1       ; INPUT BUFFER POINTER
```

```
                        CALL    $DAT            ; CONVERT THE DATE
                        BR      20$             ; CONTINUE
                10$:    MOV     #MSG7L,R3       ; '** INVALID DATE **'
                        CALL    $MOVE           ; LOAD THE TEXT
                20$:    CLRB    (R0)            ; ASCIZ TERMINATOR
                        MOV     #$BUFRX,R0      ; BUFFER POINTER
                        CALL    $PRINT          ; PRINT THE DATE
                        RETURN                  ;

                ;+
                ; **-BSFDAT-DISPLAY THE BAD SECTOR FILE CONTENTS
                ;
                ; THIS ROUTINE PRINTS THE DEFECT ADDRESS ENTRIES IN THE MDBSF
                ;
                ; INPUT:
                ;       R3 = START OF THE BAD SECTOR FILE DATA AREA
                ;       SSFLST = -1 IF THE SSF IS BEING LISTED
                ;
                ; OUTPUT:
                ;       NONE
                ;
                ;-

                BSFDAT: TST     (R3)            ; LOOK FOR END OF ENTRIES
                        BPL     10$             ; IF PL, FILE ENTRIES PRESENT
                        MOV     #MSG8L,R0       ; '** NO ENTRIES **'
                        CALL    $PRINT          ;
                        BR      40$             ; EXIT
                10$:    MOV     #MSG6L,R0       ; 'CYL,TRK,SEC'
                        CALL    $PRINT          ;
                20$:    MOV     #$BUFRX,R0      ; OUTPUT BUFFER POINTER
                        MOV     (R3),$CYL       ; LOAD THE CYLINDER ADDRESS
                        MOVB    3(R3),$TRK      ; LOAD THE TRACK ADDRESS
                        MOVB    2(R3),$SEC      ; LOAD THE SECTOR ADDRESS
                        MOV     (R3)+,R1        ; GET THE CYLINDER ADDRESS
                        BMI     40$             ; IF MI, NO MORE ENTRIES
                        CLR     R2              ; ENABLE ZERO SUPRESSION
                        CALL    $CBDMG          ; CONVERT
                        MOVB    #',,(R0)+       ; SEPARATOR
                        MOVB    1(R3),R1        ; TRACK ADDRESS
                        CLR     R2              ; ENABLE ZERO SUPRESSION
                        CALL    $CBDMG          ; CONVERT
                        MOVB    #',,(R0)+       ; SEPARATOR
                        MOVB    (R3)+,R1        ; SECTOR ADDRESS
                        TSTB    SSFLST          ; LISTING THE SSF CONTENTS ?
                        BNE     30$             ; IF NE, YES
                        TSTB    $SWLOG          ; PRINT BSF LOGICAL ADDRESSES ?
                        BNE     30$             ; IF NE, YES
                        CALL    $SRSSF          ; CHECK THE SSF
                        BCS     30$             ; IF CS, SECTOR ENTRY PHYSICAL VALUE
                        INC     R1              ; INCREMENT THE SECTOR ADDRESS
                30$:    TST     (R3)+           ; INCREMENT THE INPUT POINTER
                        CLR     R2              ; ENABLE ZERO SUPRESSION
                        CALL    $CBDMG          ; CONVERT
                        CLRB    (R0)            ; ASCIZ TERMINATOR
                        MOV     #$BUFRX,R0      ; OUTPUT BUFFER POINTER
                        CALL    $PRINT          ; PRINT THE ADDRESS
```

```
    231 001212  000723                     BR      20$             ; LOOP
    232 001214  000207             40$:    RETURN                  ;
    233
    234                                    ;+
    235                                    ; **-HDASN-DISPLAY THE HDA SERIAL NUMBER
    236                                    ;
    237                                    ; THIS ROUTINE CONVERTS THE HDA SERIAL NUMBER FROM THE DEC STD 144
    238                                    ; FILES OR THE SSF TO ASCII AND PRINTS IT.
    239                                    ;
    240                                    ; INPUTS:
    241                                    ;       R1 = SERIAL NUMBER FIELD POINTER
    242                                    ;
    243                                    ; OUTPUTS:
    244                                    ;       NONE
    245                                    ;
    246                                    ;-
    247
    248 001216  012167  177116     HDASN:  MOV     (R1)+,DPARS+2   ; EXCHANGE S/N MSB & LSB
    249 001222  011167  177110             MOV     (R1),DPARS      ;
    250 001226  012701  000336'            MOV     #DPARS,R1       ; RELOAD THE SERIAL NUMBER POINTER
    251 001232  012703  000121'            MOV     #MSG5L,R3       ; 'HDA S/N: '
    252 001236  012700  000000G            MOV     #$BUFRX,R0      ; BUFFER POINTER
    253 001242  004767  000000G            CALL    $MOVE           ; LOAD THE BUFFER
    254 001246  005002                     CLR     R2              ; SUPRESS LEADING ZEROS
    255 001250  004767  000000G            CALL    $CDDMG          ; CONVERT THE SERIAL NUMBER TO ASCII
    256 001254  105010                     CLRB    (R0)            ; ASCIZ TERMINATOR
    257 001256  012700  000000G            MOV     #$BUFRX,R0      ; BUFFER ADDRESS
    258 001262  004767  000000G            CALL    $PRINT          ; PRINT THE SERIAL NUMBER
    259 001266  000207                     RETURN                  ;
    260
    261         000001             .END
```

SYMBOL TABLE

```
BASYR = ****** GX       MSG2L   000043R       SFDATE  000702R       $MDBSF= ****** GX       $SRSSF= ****** GX
BSFDAT  001034R         MSG3L   000062R       SPACE   000333R       $MOVE = ****** GX       $SSF  = ****** GX
DPARS   000336R         MSG4L   000101R       SSFLST  000335R       $PRINT= ****** GX       $SSFHD= ****** GX
HDASN   001216R         MSG5L   000121R       $BUFRX= ****** GX     $PRNTO= ****** GX       $SWLOG= ****** GX
MSG1L   000000R         MSG6L   000133R       $CBDMG= ****** GX     $RDBSF= ****** GX       $SWLST= ****** GX
MSG10L  000227R         MSG7L   000147R       $CDDMG= ****** GX     $RDSSF= ****** GX       $TRK  = ****** GX
MSG11L  000251R         MSG8L   000170R       $CYL  = ****** GX     $RM80L  000362RG        $UDBSF= ****** GX
MSG12L  000302R         MSG9L   000207R       $DAT  = ****** GX     $SEC  = ****** GX

. ABS.  000000      000
        001270      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  471 WORDS  ( 2 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:10
[300,20]FMTR8L,[300,30]FMTR8L=[300,10]FMTR8L
```

```
                        .TITLE  FMTINT - INITIALIZE MDBSF, UDBSF, SSF
                        .IDENT  /01.00/
                        ;
                        ;
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                        ;
                        ;
                        ;  VERSION 01.00
                        ;
                        ; C. HESS        15-AUG-80
                        ; M. LEAVITT     14-JAN-81
                        ;
                        .NLIST  BEX
000000  052  052  040  MSG1RI: .ASCIZ  /** WARNING - BAD SECTOR FILES WILL BE OVERWRITTEN ON /
                        .EVEN
```

```
                                        ;+
                                        ; **-$RM80I-INITIALIZE THE RM80'S MDBSF, UDBSF, & SSF TRACKS
                                        ;
                                        ; THIS ROUTINE WILL FORMAT THE DEC STD 144 TRACK AND THE SSF TRACK
                                        ;  AND WRITE NULL 16 BIT DEC STD 144 AND SKIP SECTOR FILES.
                                        ;
                                        ; INPUTS:
                                        ;       NONE
                                        ;
                                        ; OUTUTS:
                                        ;       NONE
                                        ;-

000066  012703  000000'         $RM80I::MOV     #MSG1RI,R3      ; WARNING MESSAGE ADDRESS
000072  004767  000000G                 CALL    $UNIT'D         ; STORE MESSAGE AND DEVICE/UNIT
000076  012703  000000G                 MOV     #$MSG24,R3      ; MESSAGE SUFFIX
000102  004767  000000G                 CALL    $MOVE           ; LOAD THE SUFFIX INTO THE MESSAGE BUFFER
000106  012700  000144G                 MOV     #$BUF+100.,R0   ; PRINT THE WARNING MESSAGE
000112  012701  000060                  MOV     #60,R1          ; 2 LINE FEED CARRIAGE CONTROL
000116  004767  000000G                 CALL    $PRNT0          ; PRINT WARNING MESSAGE
000122  012700  000000G                 MOV     #$MSG31,R0      ; 'YES-NO' MESSAGE POINTER
000126  004767  000000G                 CALL    $PRMPT          ; PROMPT AND GET RESPONSE
000132  001404                          BEQ     1$              ; IF EQ, RESPONSE WAS 'NO'
000134  122767  000131  000000G        CMPB    #'Y,$BUFRX      ; SEE IF RESPONSE WAS 'YES'
000142  001402                          BEQ     2$              ; IF EQ, RESPONSE WAS 'YES'
000144  000167  000000G          1$:    JMP     $FMTEX          ; EXIT
000150  012703  000374           2$:    MOV     #256.-4,R3      ; GET NUMBER OF ENTRIES TO RESET
000154  012700  000000G                 MOV     #$MDBSF,R0      ; GET START OF MDBSF
000160  016720  000000G                 MOV     $SNAME,(R0)+    ; STUFF THE NEW SERIAL NUMBER
000164  016720  000002G                 MOV     $SNAME+2,(R0)+  ; ...
000170  005020                          CLR     (R0)+           ; BLANK WORD
000172  005020                          CLR     (R0)+           ; SHOW NOT AN ALIGNMENT DISK
000174  012720  177777           3$:    MOV     #-1,(R0)+       ; EMPTY THE MDBSF
000200  005303                          DEC     R3              ; FINISHED?
000202  001374                          BNE     3$              ; IF NE NO
000204  012700  000000G                 MOV     #$UDBSF,R0      ; GET START OF UDBSF
000210  016720  000000G                 MOV     $SNAME,(R0)+    ; STUFF THE NEW SERIAL NUMBER
000214  016720  000002G                 MOV     $SNAME+2,(R0)+  ; ...
000220  005020                          CLR     (R0)+           ; BLANK WORD
000222  005020                          CLR     (R0)+           ; SHOW NOT AN ALIGNMENT DISK
000224  012703  000374                  MOV     #256.-4,R3      ; GET NUMBER OF ENTRIES TO RESET
000230  012720  177777           4$:    MOV     #-1,(R0)+       ; EMPTY THE UDBSF
000234  005303                          DEC     R3              ; FINISHED?
000236  001374                          BNE     4$              ; IF NE NO
000240  012703  000000C                 MOV     #256.*<$SSFLN>,R3       ; SSF SIZE
000244  012700  000000G                 MOV     #$SSF,R0        ; SSF BUFFER POINTER
000250  012720  177777           5$:    MOV     #-1,(R0)+       ; CLEAR A LOCATION
000254  005303                          DEC     R3              ; COUNT THE LOCATION
000256  001374                          BNE     5$              ; IF NE, NOT FINISHED
000260  016767  000000G 000000G         MOV     $SNAME,$SSF     ; SERIAL NUMBER LSB
000266  016767  000002G 000002G         MOV     $SNAME+2,$SSF+2 ; SERIAL NUMBER MSB
000274  016767  000000G 000004G         MOV     DPARS,$SSF+4    ; CREATION DATE
000302  016767  000000G 000006G         MOV     DPARS,$SSF+6    ; REVISION DATE
000310  005067  000010G                 CLR     $SSF+10         ; REVISION NUMBER
000314  012767  000001  000012G        MOV     #1,$SSF+12      ; SSF DATA TYPE INDICATOR (16 BIT)
000336  005067  000022G                 CLR     $SSF+22         ; NUMBER OF SSF ENTRIES
000342  005067  000024G                 CLR     $SSF+24         ; CHECKSUM
```

```
    101 000346  004767  000000G                 CALL    $R80SF          ; CALL THE 'SPECIAL FORMATTER'
    102 000352  004767  000000G                 CALL    $WTBSF          ; WRITE THE DEC STD 144 INFORMATION
    103 000356  004767  000000G                 CALL    $WTSSF          ; WRITE THE SSF
    104 000362  105067  000000G                 CLRB    $SWINT          ; CLEAR THE INITIALIZATION FLAG
    105 000366  000207                  6$:     RETURN                  ;
    106
    107         000001                  .END
```

SYMBOL TABLE

```
DPARS = ****** GX       $MDBSF= ****** GX       $PRMPT= ****** GX       $SNAME= ****** GX       $UDBSF= ****** GX
MSG1RI  000000R         $MOVE = ****** GX       $PRNTO= ****** GX       $SSF  = ****** GX       $UNTID= ****** GX
$BUF  = ****** GX       $MSG24= ****** GX       $RM80I  000066RG        $SSFLN= ****** GX       $WTBSF= ****** GX
$BUFRX= ****** GX       $MSG31= ****** GX       $R80SF= ****** GX       $SWINT= ****** GX       $WTSSF= ****** GX
$FMTEX= ****** GX

. ABS.  000000     000
        000370     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  489 WORDS  ( 2 PAGES)
DYNAMIC MEMORY:  7942 WORDS  ( 30 PAGES)
ELAPSED TIME:  00:00:07
[300,20]FMTINT,[300,30]FMTINT=[300,10]FMTINT
```