

# RL01

RL01 PERFORMANCE EXERCISER  
MD-11-DZRLE-A

EP-DZRLE-A

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JAN 1978

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MADE IN USA



IDENTIFICATION

PRODUCT CODE    MAINDEC-11-DZRLE-A-D  
PRODUCT NAME    RLO1 PERFORMANCE EXERCISEP  
DATE CREATED    11 OCTOBER 1977  
MAINTAINER      DIAGNOSTIC ENGINEERING  
AUTHOR          D DENNIS

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1 0 GENERAL INFORMATION  
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1 1 PROGRAM ABSTRACT  
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1 1 1 STRUCTURE OF PROGRAM  
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THIS DIAGNOSTIC OCCUPIES 14 5K WORDS OF MEMORY AND IS COMPATIBLE WITH BOTH XXDP AND ACT. IT CAN BE RUN STANDALONE UNDER XXDP, AND CAN BE CHAINED UNDER XXDP, ACT AND APT IN ACT MODE (SEE "CREATE CORE IMAGE" COMMAND BELOW FOR DETAILS OF CHAINING PROCEDURE). IT IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, BUT WE HAVE INCORPORATED INTO IT A CONTROL MODULE WHICH WILL LATER BE RELEASED INDEPENDENTLY AS A DIAGNOSTIC SUPERVISOR.

WHEN THIS DIAGNOSTIC IS STARTED AT ADDRESS 200, CONTROL GOES FIRST TO THE SUPERVISOR PORTION, WHICH WILL ASK CERTAIN "HARD CORE" QUESTIONS ABOUT THE ENVIRONMENT. THEN IT WILL ENTER COMMAND MODE, INDICATED BY A PROMPT CHARACTER (DS A)) AT COMMAND MODE THE OPERATOR MAY ENTER ANY OF SEVERAL COMMANDS AS DESCRIBED BELOW.

THE SUPERVISOR CODING FOLLOWS IMMEDIATELY THE DIAGNOSTIC TEST CODING, BUT THE SUPERVISOR LISTING HAS BEEN SUPPRESSED FOR GENERAL DISTRIBUTION. A LIMITED DISTRIBUTION HAS BEEN MADE TO FIELD SERVICE OF THE SUPERVISOR ASSEMBLY LISTING, AND IT MAY BE CONSULTED IN EVENT OF A SOFTWARE PROBLEM.

1 1 2 DIAGNOSTIC INFORMATION  
-----

THE RLO1/RLV11 RLO1 EXERCISER IS A PDP-11 (LSI-11) BASED PROGRAM. IT WILL RANDOMLY EXERCISE UP TO 2 CONTROLLERS AND 8 DRIVES. AFTER AN INITIAL WRITE OF EACH RLO1, THE DRIVES ARE RANDOMLY PICKED AND GIVEN A RANDOM FUNCTION OF SEEK, GET STATUS, READ HEADER, READ OR WRITE.

1 2 SYSTEM REQUIREMENTS  
-----

1 2 1 HARDWARE REQUIREMENTS  
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- PDP-11/LSI-11 PROCESSOR WITH 16K OR MORE OF CORE
- CONSOLE DEVICE (LA30, LA36, VT50, ETC.)
- RL11/RLV11 CONTROLLER(S)
- 1 - 8 RLO1 DRIVES
- 1 - 8 RLO1K CARTRIDGES WITH BAD SECTOR FILE
- KW11P, KW11L (OPTIONAL)
- LINEPRINTER (OPTIONAL)

1 2 2 SOFTWARE REQUIREMENTS  
-----

MAINDEC-11-DZRLE-A

1 3 RELATED DOCUMENTS AND STANDARDS  
-----

RLO1 USERS MANUAL (EK-RLO1-UG-PRE)  
 YYDP USERS MANUAL  
 DIAGNOSTIC SUPERVISOR PROGRAM LISTING

1 4 DIAGNOSTIC HIERARCHY PREREQUISITES  
 -----

THE RLO1 SUBSYSTEM SHOULD HAVE SUCCESSFULLY RUN THE FOLLOWING PROGRAMS:

|             |  |
|-------------|--|
| MD-11-DZRLA | RL11/RLV11 RLO1 CONTROLLER TEST (PART 1) |
| MD-11-DZRLB | RL11/RLV11 RLO1 CONTROLLER TEST (PART 2) |
| MD-11-DVRLA | RLV11 RLO1 DISKLESS TEST (RLV11 ONLY)    |
| MD-11-DZRLC | RLO1 DRIVE TEST (PART 1)                 |
| MD-11-DZRLD | RLO1 DRIVE TEST (PART 2)                 |

1 5 ASSUMPTIONS  
 -----

THE HARDWARE OTHER THAN THE RLO1 SUBSYSTEM IS ASSUMED TO WORK PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, ETC., DO NOT FUNCTION PROPERLY.

2 0 OPERATING INSTRUCTIONS  
 -----

2 1 LOADING AND STARTING PROCEDURES  
 -----

2 1 1 LOADING PROCEDURES  
 -----

FOLLOW STANDARD DEC PROCEDURES TO LOAD THE PROGRAM (XXDP, ABSOLUTE LOADER, UPD1, UPD2)

2 1 2 STARTING PROCEDURES  
 -----

THE PROGRAM STARTS AT LOCATION 200. USE STANDARD DEC PROCEDURES TO START THE PROGRAM.

2 1 3 STEPS FOR QUICK AND SIMPLE EXECUTION  
 -----

THE DIAGNOSTIC CAN BE EXECUTED STANDALONE WITHOUT READING THE REMAINDER OF THIS DOCUMENT AS FOLLOWS:

- A) LOAD THE DIAGNOSTIC
- B) START AT ADDRESS 200
- C) ANSWER THE HARDWARE QUESTIONS
- D) RECEIVE PROMPT (DS A)
- E) ENTER STA<CR>
- F) ANSWER HARDWARE AND SOFTWARE QUESTIONS
- G) GET END OF PASS MESSAGES OR ERPOP MESSAGES
- H) TO END EXECUTION ENTER CONTROL/C

## 2 2 SPECIAL ENVIRONMENTS

THE ENVIRONMENTS THIS PROGRAM WILL RUN IN ARE XXDP, XXDP CHAIN  
ACT, SLIDE AND APT

## 2 3 PROGRAM OPTIONS

## 2 3 1 START COMMAND

```
*****
ETA(PT)/TESTS <TEST-LIST>/PASS <PASS-CNT>/FLAGS <FLAG-LIST>/EOP <INCR>
*****
```

## 2 3 1 1 TESTS SWITCH (/TESTS &lt;TEST-LIST&gt;)

TEST-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1 2 ETC ) OR RANGES  
OF DECIMAL NUMBERS (1-5 8-10 ETC ) SEPARATED BY COLONS, SPECIFYING  
WHICH TESTS IT IS DESIRED BE EXECUTED THE TEST NUMBERS RANGE FROM  
1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC THEY MAY BE SPECIFIED  
IN ANY ORDER TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS  
OF ORDER OF SPECIFICATION THE DEFAULT IS TO EXECUTE ALL TESTS ON  
THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION USED IN THE  
DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE OPEATOR. SEE EXAMPLE  
AT END OF 2 3 1

## 2 3 1 2 PASS SWITCH (/PASS &lt;PASS-CNT&gt;)

<PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES.  
A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS)  
AGAINST ALL UNITS SUBMITTED THE DEFAULT IS NON-ENDING EXECUTION IE,  
EXIT IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C OR BY A HALT ON ERROR  
BEING ENCOUNTERED, IN WHICH CASE WE RETURN TO COMMAND MODE. SEE EXAMPLE  
AT END OF 2 3 1

## 2 3 1 3 FLAGS SWITCH (/FLAGS &lt;FLAG-LIST&gt;)

FLAG-LIST> IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>,  
OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS ONE OF  
THE FOLLOWING VALUES:

|     |   |
|-----|---|
| HCE | HALT ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN<br>ERROR IS ENCOUNTERED   |
| LOE | LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY<br>WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT,<br>SUBTEST, OR TEST) CONTAINING THE ERROR |
| IER | INHIBIT ERROR REPORTING   |
| IBE | INHIBIT BASIC ERROR REPORTS   |
| IXE | INHIBIT EXTENDED ERROR REPORTS  |
| PRI | DIRECT ALL MESSAGES TO A LINE PRINTER   |
| PNT | PRINT NUMBER OF TEST BEING EXECUTED   |
| BOE | BELL ON ERROR   |
| UAM | RUN IN UNATTENDED MODE, BYPASSING MANUAL INTERVENTION TESTS   |
| ISR | INHIBIT STATISTICAL REPORTS   |
| IDP | INHIBIT DROPPING OF UNITS BY DIAGNOSTIC   |

THE FLAGS NAMED OR EQUATED TO 1 ARE SET, THOSE EQUATED TO 0 ARE CLEARED. A FLAG NOT SPECIFIED IS CLEARED. IF THE FLAGS SWITCH IS NOT GIVEN ALL FLAGS ARE CLEARED. SEE EXAMPLE AT END OF 2 3 1

#### 2 3 1 4 END OF PASS SWITCH (/EOP <INCR>)

INCR> IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF PASSES) IT IS DESIRED THAT THE END OF PASS MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS. SEE EXAMPLE AT END OF 2 3 1

#### 2 3 1 5 EFFECT OF COMMAND

THE EFFECT OF THE START COMMAND IS TO INITIATE THE HARDWARE PARAMETER DIALOGUE, THE SOFTWARE PARAMETER DIALOGUE, AND THEN THE DIAGNOSTIC TESTS THEMSELVES.

THE HARDWARE PARAMETER DIALOGUE COMMENCES WITH THE QUESTION "# UNITS?" TO WHICH THE OPERATOR REPLIES WITH A DECIMAL NUMBER N FROM 1 TO 64. THE TERM "UNIT" REFERS TO THE DEVICE TO WHICH THIS SERIES OF DIAGNOSTICS IS DEDICATED. FOLLOWING THIS ARE THE QUESTIONS WHEREBY THE P-TABLES THEMSELVES WILL BE BUILT. EACH P-TABLE IS A CORE-RESIDENT TABLE CONTAINING ALL THE HARDWARE INFORMATION FOR ONE UNIT. THE OPERATOR MUST SUPPLY N (NUMBER OF UNITS) VALUES FOR EACH QUESTION. HE MAY DO THIS BY GIVING ONE ANSWER TO EACH QUESTION (IN WHICH CASE THE SERIES OF QUESTIONS WILL BE POSED N TIMES) OR BY GIVING N VALUES, SEPARATED BY COMMAS, TO EACH QUESTION (SERIES WILL BE POSED ONCE). EACH QUESTION IS FOLLOWED BY THE RESPONSE RADIX (D FOR DECIMAL, B FOR BINARY, O FOR OCTAL, L FOR YES/NO) IN PARENTHESES AND THE DEFAULT VALUE AFTER THE PARENTHESES.

FOLLOWING THE HARDWARE QUESTIONS ARE THE SOFTWARE QUESTIONS TO BUILD THE SOFTWARE TABLES, WHICH DEFINE THE MODE (QUICK VERIFY ETC.) THAT THE DIAGNOSTIC WILL EXECUTE IN.

AT THE POINT WHERE THE QUESTION "# UNITS?" IS ANSWERED, CORE STORAGE IS ALLOCATED FOR THE P-TABLES, AND IF THERE IS NOT ENOUGH TO ACCOMMODATE THEM THE MESSAGE "TOO MANY UNITS" IS ISSUED. IN THIS CASE THE DIAGNOSTIC MUST BE EXECUTED MORE THAN ONCE TO TEST ALL UNITS.

#### EXAMPLE

STA TESTS 1 2-4 6 8-10/PASS 3/FLAGS IER HOE=1 UAM LOE

THIS COMMAND WILL CAUSE THREE PASSES TO BE MADE, EACH PASS CONSISTING OF TESTS 1, 2, 3, 4, 6, 8, 9, AND 10 EXECUTED AGAINST ALL UNITS. THERE IS NO DIFFERENCE BETWEEN SAYING <FLAG> AND SAYING <FLAG=1>. THE NOTATION <FLAG=0> IS MEANINGFUL ONLY ON A COMMAND OTHER THAN START TO CLEAR A FLAG THAT WAS PREVIOUSLY SET. NOTE THAT ON ALL COMMANDS ONLY THE FIRST THREE LETTERS ARE SCANNED.

#### 2 3 2 PESTART COMMAND

\*\*\*\*\*  
 RES(TAR?)/TESTS <TEST-LIST>/PASS <PASS-CNT>/FLAGS <FLAG-LIST>/UNITS <UNIT-LIST>  
 \*\*\*\*\*

## 2.3.2.1 TESTS, PASS, AND FLAGS SWITCHES

TEST-LIST), <PASS-CNT>, AND <FLAG-LIST> ARE AS IN THE START COMMAND

## 2.3.2.2 UNITS SWITCH (/UNITS &lt;UNIT-LIST&gt;)

<UNIT-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1,2 ETC ) OR RANGES OF DECIMAL NUMBERS (1-5, 8-10 ETC ) SEPARATED BY COLONS, INDICATING WHICH UNITS IT IS DESIRED BE TESTED THE NUMBERS MAY RANGE FROM 1 THRU N (N IS THE NUMBER OF UNITS SPECIFIED IN THE PREVIOUS START COMMAND) THE NUMBER INDICATES THE POSITION OF THE P-TABLE AS THE DATA WAS ENTERED DURING THE HARDWARE DIAGLOGUE THE UNITS WHICH ARE SELECTED MUST NOT HAVE BEEN DROPPED BY THE DROP COMMAND SEE THE DISCUSSION OF ADD AND DROP COMMANDS BELOW DEFAULT IS TO TEST ALL UNITS WHICH HAVE NOT BEEN DROPPED BY A DROP COMMAND

## 2.3.2.3 EFFECT OF COMMAND

THE RESTART COMMAND DIFFERS FROM THE START COMMAND IN THAT THE P-TABLES FROM THE PREVIOUS START COMMAND (THERE MUST HAVE BEEN ONE) ARE USED, INSTEAD OF NEW ONES BEING BUILT THE UNITS SWITCH GIVES THE ABILITY TO SELECT A SUBSET OF THESE THE SOFTWARE DIALOGUE MAY OPTIONALLY BE RE-EXECUTED (OPERATOR WILL BE ASKED) THE COMMAND CAN BE USED AFTER COMMAND MODE HAS BEEN REENTERED IN ANY OF THE THREE NORMAL WAYS A) THE REQUESTED NUMBER OF PASSES HAVE BEEN MADE B) AN ERROR WAS ENCOUNTERED WITH THE HALT ON ERROR FLAG SET C) A CONTROL/C WAS ENTERED BY THE OPERATOR

## 2.3.3 CONTINUE COMMAND

```
*****
CON(TINUE)/PASS <PASS-CNT/FLAGS. <FLAG-LIST>
*****
```

## 2.3.3.1 PASS SWITCH (/PASS &lt;PASS-CNT&gt;)

<PASS-CNT> IS SAME AS IN START COMMAND, BUT THE DEFAULT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART IF NONE REMAINS, THE DEFAULT IS NON-ENDING EXECUTION

## 2.3.3.2 FLAG SWITCH (/FLAGS &lt;FLAG-LIST&gt;)

<FLAG-LIST> IS SAME AS IN START COMMAND BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE

## 2.3.3.3 EFFECT OF COMMAND

CONTINUE MUST FOLLOW A START OR RESTART, AND COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED HARDWARE PARAMETERS MAY NOT BE CHANGED

## 2.3.4 PROCEED COMMAND

```
*****
```

PROCEED)/FLAGS <FLAG-LIST>

\*\*\*\*\*

2 3 4 1 FLAGS SWITCH (/FLAGS <FLAG-LIST>)

<FLAG-LIST> IS AS IN THE START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE

2 3 4 2 EFFECT OF COMMAND

PROCEED MUST FOLLOW A START, RESTART, OR CONTINUE. COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EFFECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

2 3 5 CREATE CORE IMAGE COMMAND

\*\*\*\*\*  
 2 3 5 TESTS <TEST-LIST>/PASS <PASS-CNT>/FLAGS <FLAG-LIST>  
 \*\*\*\*\*

2 3 5 1 TESTS, PASS, AND FLAGS SWITCHES

<TEST-LIST>, <PASS-CNT>, <FLAG-LIST>, AND ARE AS IN THE START COMMAND, EXCEPT THAT THE UAM (UNATTENDED MODE) FLAG DEFAULTS TO THE SET POSITION.

2 3 5 2 EFFECT OF COMMAND

THE PURPOSE OF THIS COMMAND IS TO CREATE A BIC FILE SUITABLE FOR CHAIN MODE EXECUTION. THE XXDP PROCEDURE IS AS FOLLOWS:

INVOKE THE XXDP UTILITY UPD1  
 LOAD XXN FILE BIN,  
 START 200  
 <QUESTIONS AND ANSWERS>  
 RESTART UPD1 USING RESTART ADDRESS  
 HICORE ADDRESS (IF "PASSED 14 5K" MESSAGE CAME)  
 DUMP XXN FILE BIC

THE OPERATOR DIALOGUE (HARDWARE AND SOFTWARE) WILL BE EXECUTED AS IN THE START COMMAND, BUT AT THE END OF THE QUESTIONS THE HALT STATE WILL BE ENTERED, AT WHICH TIME THE OPERATOR SHOULD DUMP THE PROGRAM TO THE XXDP LIBRARY USING A BIC EXTENSION TO INDICATE THAT THIS FILE IS CHAINABLE. HE SHOULD USE THE XXDP UTILITY "UPD1" TO DO THIS. IF THE P-TABLES EXTEND BEYOND 14 5K, A MESSAGE WILL BE ISSUED GIVING THE NEW UPPER CORE LIMIT, TO WHICH THE OPERATOR MUST ADJUST BEFORE DUMPING. HE MAY NOW DELETE THE NON-CHAINABLE BIN FILE IF DESIRED, SINCE THE BIC FILE HAS ALL THE CAPABILITIES OF IT.

WHEN THIS BIC FILE IS SUBSEQUENTLY EXECUTED IN CHAIN MODE, THE OPERATOR DIALOGUES WILL BE BYPASSED. HOWEVER, IF IT IS EXECUTED STANDALONE, THE DIALOGUE WILL BE REISSUED.

NOTE THAT IF THE MESSAGE "TOO MANY UNITS" IS ISSUED, TWO OR MORE CORE IMAGES MUST BE CREATED (WITH DIFFERENT NAMES) TO TEST ALL UNITS.

2 3 6 ADD COMMAND

-----

\*\*\*\*\*  
ADD/UNITS <UNIT-LIST>  
\*\*\*\*\*

2 3 6 1 UNITS SWITCH (/UNITS <UNIT-LIST>

<UNIT-LIST> IS AS IN THE RESTART COMMAND

2 3 6 2 EFFECT OF COMMAND

THE UNITS SPECIFIED ARE ADDED TO THE TEST SEQUENCE EACH UNIT  
MUST HAVE A P-TABLE IN MEMORY DUE TO AN EARLIER HARDWARE DIALOGUE.  
THIS COMMAND MUST BE FOLLOWED BY A RESTART OR CONTINUE THE UNITS  
SWITCH MUST BE SPECIFIED THE ADD COMMAND IS MEANINGFUL ONLY FOR UNITS  
THAT WERE PREVIOUSLY DROPPED

2 3 7 DROP COMMAND

-----

\*\*\*\*\*  
DROP/UNITS <UNIT-LIST>  
\*\*\*\*\*

2 3 7 1 UNITS SWITCH (/UNITS <UNIT-LIST>

<UNIT-LIST> IS AS IN THE RESTART COMMAND

2 3 7 2 EFFECT OF COMMAND

THE UNITS SPECIFIED WILL BE DROPPED FROM TESTING THE UNITS WILL  
BE RESELECTED ONLY BY THE EXECUTION OF AN ADD OR START COMMAND  
THE UNITS SWITCH MUST BE ENTERED THIS COMMAND MUST BE  
FOLLOWED BY A RESTART OR A CONTINUE COMMAND

2 3 8 PRINT COMMAND

-----

\*\*\*\*\*  
PRINT  
\*\*\*\*\*

2 3 8 1 EFFECT OF COMMAND

ALL STATISTICS TABLES ACCUMULATED BY THE DIAGNOSTIC ARE PRINTED THE  
ISR (INHIBIT STATISTICAL REPORTING) FLAG IS CLEARED

2 3 9 DISPLAY COMMAND

-----

\*\*\*\*\*  
DIS(PLAY)/UNITS <UNIT-LIST>  
\*\*\*\*\*

2 3 9 1 UNITS SWITCH (/UNITS <UNIT-LIST>

<UNIT-LIST> IS AS IN THE RESTART COMMAND

## 2 3 9 2 EFFECT OF COMMAND

SEQ 0009

THE HARDWARE P-TABLES FOR ALL UNITS UNDER TEST ARE PRINTED OUT IN THE  
 FORMAT IN WHICH THEY WERE ENTERED ANY UNITS THAT WERE DROPPED BY THE  
 OPERATOR "DROP" COMMAND ARE SO DESIGNATED

2 3 10 FLAGS COMMAND  
-----

\*\*\*\*\*  
 FLAGS  
 \*\*\*\*\*

## 2 3 10 1 EFFECT OF COMMAND

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED

2 3 11 ZFLAGS COMMAND  
-----

\*\*\*\*\*  
 ZFLAGS  
 \*\*\*\*\*

## 2 3 11 1 EFFECT OF COMMAND

ALL FLAGS ARE CLEARED

2 3 12 HARDWARE PARAMETERS  
-----

THE FOLLOWING QUESTIONS WILL BE ASKED ON A START COMMAND THE  
 VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT  
 VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONSE

RL11 (L) Y?

ANSWER YES(Y) IF YOU HAVE AN RL11 CONTROLLER, NO(N) IF YOU  
 HAVE AN RL111 CONTROLLER

BUS ADDRESS (0) 174400?

ANSWER WITH THE BUS ADDRESS OF THE CONTROLLER

VECTOR (0) 330?

ANSWER WITH THE INTERRUPT VECTOR OF THE CONTROLLER

BR LEVEL (0) 5?

ANSWER WITH THE INTERRUPT PRIORITY OF THE CONTROLLER

DRIVE (0) 0?

ANSWER WITH THE DRIVE(S) CONNECTED TO THE CONTROLLER

2 3 13 SOFTWARE PARAMETERS  
-----

K 1

THE FOLLOWING QUESTIONS ARE ASKED IF REQUESTED ON A START, RESTART, OR CONTINUE. THEY ALLOW FLEXIBILITY IN THE WAY THE PROGRAM BEHAVES. THE SOFTWARE PARAMETERS GIVE THE PROGRAM FLEXIBILITY IN THE WAY IT RUNS. THE PARAMETERS CAN BE MODIFIED ON A START, RESTART, OR CONTINUE BY ANSWERING (Y)ES TO THE FOLLOWING QUESTION:

CHANGE S W ?

A YES ANSWER WILL ASK THE FOLLOWING SOFTWARE PARAMETER QUESTIONS, WITH THE PRESENT DEFAULT VALUE PRINTED TO THE LEFT OF THE QUESTION MARK (THE LAST ANSWER GIVEN IS THE DEFAULT) THE DEFAULT IS TAKEN ON A <CR> CONTROL Z ( Z ) WILL DEFAULT ALL REMAINING QUESTIONS AND START THE TEST

2 3 12 1 RETRY LMT X?

THIS IS THE NUMBER OF TIMES THE PROGRAM WILL ATTEMPT A COMMAND BEFORE IT QUILTS AND REPORTS A HARD ERROR. IF THE RETRY IS SUCCESSFUL BEFORE THE RETRY LIMIT IS EXCEEDED IT WILL PRINT AND LOG A SOFT ERROR

LIMITS 0 - 65,535

2 3 13 2 SEEK RETRY LMT X?

THIS IS THE NUMBER OF RETRYs THAT WILL BE ATTEMPTED TO SEEK TO A CYLINDER ON A MIS-SEEK. AFTER RETRY IS EXHAUSTED, WE WILL NOT TRY FOR THAT CYLINDER BUT CONTINUE WITH A NEW CYLINDER

LIMITS 0 - 65,535

2 3 13 3 DATA DMP ON DCK ERR X?

GIVES THE ABILITY TO SEE THE 1 SECTOR BUFFER THAT HAD A DATA CRC ERROR. THE RESULTS OF THE PRINTOUT ARE ONE OF TWO POSSIBILITIES

- 1 ONLY THOSE WORDS OF THE SECTOR THAT WERE BAD ARE PRINTED WITH WHAT WAS EXPECTED
- 2) IF ONE OF THE 1ST TWO WORDS IS BAD (USED TO KEY) THE ENTIRE BUFFER IS DUMPED

LIMITS Y OR N

2 3 13 4 # OF ERR DUMPED

THIS IS THE NUMBER OF MISCOMPARES THAT WILL BE PRINTED

LIMITS 0 - 128

2 3 13 5 TIME BETW REPORTS (MIN) X?

L 1  
THIS IS THE INTERVAL BETWEEN AUTOMATIC STATISTIC REPORTS  
ON ALL DRIVES IF A CLOCK IS PRESENT AND WAS ANSWERED  
SO IN THE INITIAL DIALOG

SEQ 0011

LIMITS 1 - 65,535

2 3 13 6 DROP DR ON ERR LMTS REACHED X?

GIVES THE ABILITY TO AUTOMATICALLY STOP TESTING ON A  
DRIVE ONCE ONE OF THE ERROR LIMITS HAVE BEEN EXCEEDED  
(SEEK, DRIVE, HARD, SOFT). IF THE ANSWER IS  
YES THEN THE FOLLOWING FOUR QUESTIONS WILL BE ASKED, IF NO  
THEN THE NEXT QUESTION WILL BE 2 3.13.11.

LIMITS Y OR N

2 3 13 7 HPD ERR LMT X?

THIS IS THE LIMIT OF HARD ERRORS THAT A DRIVE WILL BE  
DROPPED ON A HARD ERROR IS ONE ON WHICH THE RETRY HAS  
BEEN EXHAUSTED

LIMITS 1 - 65,535

2 3 13 8 SFT ERR LMT X?

THIS IS THE LIMIT OF SOFT ERRORS THAT A DRIVE  
WILL BE DROPPED ON A SOFT ERROR IS AN ERROR ON AN  
OPERATION THAT WAS SUCCESSFUL WITHIN THE RETRY LIMIT.

LIMITS 1 - 65,535

2 3 13 9 DATA MISCOMPARE LIMIT X?

THIS IS THE LIMIT OF IN CORE MISCOMPARES THAT THE DRIVE WILL BE  
DROPPED ON

LIMITS 1 - 65,535

2 3 13 10 SF ERR LMT X?

THIS IS THE LIMIT OF MIS-SEEK AND TRACKING ERRORS THAT A DRIVE  
WILL BE DROPPED ON

LIMITS 1 - 65,535

2 3 13 11 DR ERR LMT X?

THIS IS THE LIMIT OF DRIVE ERRORS THAT A DRIVE  
WILL BE DROPPED ON

LIMITS 1 - 65,535

2 3 13 12 DROP DR ON OPER LMTS REACHED X?

GIVES THE ABILITY TO STOP TESTING ON A DRIVE THAT HAS EXCEEDED CERTAIN OPERATION LIMITS (SEEK, BITS TRANSFERRED). THE DRIVE WILL BE DROPPED ONLY WHEN BOTH HAVE BEEN EXCEEDED. IF THE ANSWER IS YES THEN THE NEXT TWO QUESTIONS WILL BE ASKED, IF NO THE NEXT QUESTION WILL BE 2 3 13 15.

LIMITS Y OR N

2 3 13 13 DATA XFER LMT (\*10(10)) X?

THIS IS THE LIMIT OF COMBINED BITS READ/WITTEN (\*10(10)) ON WHICH THE DRIVE WILL BE DROPPED

LIMITS 1 - 65,535

2 3 13 14 SF LMT (\*10(3)) X?

THIS IS THE LIMIT OF SEEK OPERATIONS (\*10(3)) ON WHICH THE DRIVE WILL BE DROPPED

LIMITS 1 - 65,535 (\*10(3))

2 3 13 15 DO YOU WANT TO CHANGE SEEK R/W PARAMETERS X?

THE NORMAL OPERATION IS TO SEEK AND TRANSFER ON THE ENTIRE CARTRIDGE, CYLINDERS 0 - 255, SECTORS 0 - 39 AND BOTH SURFACES. THE NORMAL TRANSFER IS RANDOM BETWEEN 3 AND 1280 WORDS.

THE NEXT 8 PARAMETERS WILL ALLOW THE USER TO CONFINE THE TESTING TO ANY CONTIGUOUS SECTION OF THE CARTRIDGE AND CONTROL THE SIZE OF THE TRANSFERS

A YES ANSWER WILL ASK THE NEXT 13 QUESTIONS, A NO WILL GO TO QUESTION 2 3 13 29

2 3 13 16 STIPULATE R/W XFER SIZE X?

THE PROGRAM WILL NORMALLY MAXIMIZE THE TRANSFER SIZE BY USING ALL OF MEMORY (<28K) AVAILABLE. THIS QUESTION IF ANSWERED YES WILL RESTRICT THE BUFFER TO THOSE VALUES GIVEN IN 2 3 13 17 AND 2 3 13 18. IF NO IS GIVEN NEXT QUESTION IS 2 3 13 19

LIMITS Y OR N

2 3 13 17 MAX XFER X?

REPRESENTS THE MAXIMUM AMOUNT OF WORDS TO READ OR WRITE

LIMITS 3 - 5120

2 3 13 18 MIN XFER X?

REPRESENTS THE MINIMUM AMOUNT OF WORDS TO READ OR WRITE

LIMITS 3 - 5120

2 3 13 19 RD ONLY X?

GIVES THE ABILITY TO INHIBIT WRITING THE PACK WHILE TESTING, THE INITIAL WRITE OF THE PACK FROM THE START COMMAND WILL STILL OCCUR

LIMITS Y OR N

2 3 13 19 RAN PAT X?

NORMAL OPERATION SHOULD BE YES, BUT THIS PARAMETER WILL ALLOW THE WRITING OF ONLY ONE PATTERN OF EIGHT NORMAL PATTERNS THE PATTERNS ARE SHOWN IN 2 3 13 21 IF ANSWER IS YES THEN 2 3 13 21 WILL BE THE NEXT QUESTION, IF NO THEN QUESTION 2 3 13 22

LIMITS Y OR N

2 3 13 21 WHICH ONE X?

IT IS NOW POSSIBLE TO CONTAIN THE EXERCISER IN WRITING ONLY ONE OF THE FOLLOWING EIGHT PATTERNS

- 0 - ALL 0'S
- 1 - 177777, 177777, 177777, 52525, 52525, 52525  
177777, 177777, 52525, 52525, 177777, 52525  
177252, 177252, 172765, 172765
- 2 - 0, 0, 0, 177777, 177777, 177777  
0, 0, 177777, 177777, 0, 177777, 0, 177777  
0, 177777
- 3 - 25252, 52525, 52525, 125252, 125252, 125252  
52525, 52525, 125252, 125252, 52525, 125252  
52525, 125252, 52525, 125252
- 4 - 155555, 133333, 66666, 155555, 133333, 66666  
155555, 133333, 66666, 155555, 133333, 66666  
155555, 133333, 66666, 155555
- 5 - 121105, 150442, 64221, 132110, 55044, 26422  
13211, 105504, 42642, 21321, 110550, 44264  
22132, 11055, 104426, 42213
- 6 - ALL 1'S
- 7 - 45513, 122645, 151322, 64551, 132264, 55132  
26455, 113226, 45513, 122645, 151322, 64551  
132264, 55132, 26455, 113226

LIMITS 0 - 7

2 3 13 22 WR CHK X?

DO YOU WISH TO PERFORM A WRITE CHECK AFTER EACH WRITE OPERATION

LIMITS Y OR N

INITIAL TRANSFERS ARE RANDOM BETWEEN 3 AND 128 WORDS. THIS PARAMETER WILL ALLOW YOU TO SPECIFY HOW MANY WORDS SHOULD BE COMPARED PER SECTOR IN CORE AFTER EACH READ. IF THE VALUE SPECIFIED IS GREATER THAN THAT READ IN ONLY THE NUMBER READ IN ARE COMPARED. THE FEWER WORDS COMPARED IN CORE ON EACH READ THE FASTER THROUGHPUT THE EXERCISER WILL HAVE

LIMITS 0 - 128

2 3 13 25 # OF DATA ERR RPT'D PER BUF X?

THIS PARAMETER WILL LIMIT THE NUMBER OF IN CORE MISCOMPARES PRINTED. THE PROGRAM WILL CONTINUE TO COMPARE AS MANY WORDS AS SPECIFIED IN 2 3 13 21 BUT WILL INHIBIT THE PRINTOUT ONCE THIS LIMIT IS REACHED. AFTER ALL WORDS ARE CHECKED A SUMMARY WILL BE PRINTED

\* WORDS BAD OUT OF 128 WORDS READ

LIMITS 0 - 126

2 3 13 23 MAX HD X?

REPRESENTS MAXIMUM HEAD TO USE IN SEEK OPERATIONS

LIMITS 0 - 1

2 3 13 26 MIN HD X?

REPRESENTS MINIMUM HEAD TO USE IN SEEK OPERATIONS

LIMITS 0 - 1

2 3 13 27 MAX CYL X?

MAXIMUM INNER CYLINDER TO BE USED IN SEEK OPERATIONS

LIMITS 0 - 255

2 3 13 28 MIN CYL X?

MINIMUM OUTER CYLINDER TO BE USED IN SEEK OPERATIONS

LIMITS 0 - 255

2 3 13 29 MAX SEC X?

MAXIMUM SECTOR TO START TRANSFER ON

LIMITS 0 - 39

2 3 12 30 MIN SEC X?

MINIMUM SECTOR TO START TRANSFER ON

LIMITS 0 - 39

AFTER ANSWERING THE LAST SOFTWARE PARAMETER THE PROGRAM WILL START THE TESTING

2 3 13 31 CHK DRDY X?

ON START UP IF THIS QUESTION IS ANSWERED YES THE PROGRAM WILL NOT TEST ANY DRIVES THAT DO NOT HAVE DRIVE READY HIGH

LIMITS Y OR N

2 3 14 EXTENDED DISCUSSION OF P-TABLE DIALOGUE

-----  
THE FULL CAPABILITY OF THE HARDWARE DIALOGUE IS REVEALED BY THE FOLLOWING DISCUSSION OF WHAT HAPPENS INTERNALLY

AS SOON AS THE QUESTION "# UNITS?" IS ANSWERED (WITH THE NUMBER N, SAY) SPACE IN CORE IS ALLOCATED FOR N P-TABLES ALL OF THE P-TABLES ARE OF THE SAME FORMAT, AND THERE IS A ONE-TO ONE CORRESPONDENCE BETWEEN THE HARDWARE PARAMETER QUESTIONS AND THE SLOTS IN THE P-TABLE FORMAT

ON THE FIRST TRIP THRU THE QUESTIONS, ALL OF THE SLOTS IN ALL OF THE P-TABLES ARE FILLED IF THE OPERATOR TYPES IN LESS THAN N EXPLICIT VALUES IN RESPONSE TO A PARTICULAR QUESTION, THESE VALUES ARE PLACED IN THE P-TABLES (ONE VALUE GOING INTO THE PROPER SLOT OF EACH P-TABLE BEGINNING WITH THE FIRST P-TABLE) UNTIL THE STRING OF VALUES IS EXHAUSTED THE LAST VALUE IN THE STRING BECOMES THE NEW DEFAULT AND IS USED THEN AND THERE TO FILL THAT SLOT IN THE REMAINING P-TABLES

ON SUBSEQUENT TRIPS THRU THE QUESTIONS, THE SAME PROCESS IS CARRIED OUT, EXCEPT THAT THE EARLIEST P-TABLE NOT TO HAVE RECEIVED AN EXPLICIT VALUE IN ANY OF ITS SLOTS NOW ASSUMES THE ROLE THAT TABLE NUMBER ONE PLAYED IN THE FIRST TRIP

THE SERIES OF QUESTIONS IS REISSUED UNTIL AT LEAST ONE QUESTION HAS RECEIVED N EXPLICIT VALUES FROM THE OPERATOR

IN GIVING A STRING OF VALUES, COMMAS WITHOUT INTERVENING VALUES MAY BE USED TO INDICATE A REPETITION OF THE LAST NAMED VALUE

A STRING OF VALUES MAY BE GIVEN AS A RANGE (6-10 FOR EXAMPLE) IF THE VALUES REPRESENT PURE NUMERICAL DATA, THIS SAMPLE RANGE TRANSLATES TO THE STRING 6,7,8,9,10 (AN INCREMENT OF 1) IF THE VALUES ARE ADDRESSES THE SAMPLE RANGE TRANSLATES TO THE STRING 6,8,10 (AN INCREMENT OF 2)

NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO CONSTRUCT A SET OF P-TABLES ASSUME THAT WE HAVE 64 UNITS, AND THAT THERE ARE THREE HARDWARE PARAMETERS FOR EACH (THREE SLOTS IN THE P-TABLE, THREE HARDWARE QUESTIONS

D 2

IN THE DIALOGUE). LET THE DESIRED VALUE FOR THE FIRST PARAMETER BE THE NUMBER 75 FOR ALL 64 TABLES. LET THE DESIRED VALUE FOR THE SECOND PARAMETER BE EQUAL TO THE UNIT NUMBER (1, 2, 3, ..., 64) EXCEPT FOR UNIT 50, WHICH SHOULD RECEIVE THE VALUE 49. LET THE DESIRED VALUE FOR THE THIRD PARAMETER BE THE NUMBER 76 FOR THE FIRST 20 UNITS AND THE NUMBER 77 FOR THE LAST 44 UNITS.

THE FOLLOWING DIALOGUE WOULD ACCOMPLISH THIS GOAL

# UNITS (D) ? 64

UNIT 1

<QUESTION 1> ? 75  
<QUESTION 2> ? 1-20  
<QUESTION 3> ? 76

UNIT 21

<QUESTION 1> ?  
<QUESTION 2> ? 21-49, 51-64  
<QUESTION 3> ? 77

THE FIRST TIME THE SERIES IS ASKED, SLOT ONE RECEIVES A 75 IN ALL 64 TABLES. SLOT TWO RECEIVES THE VALUES 1, 2, 3, ..., 20 IN TABLES 1 THRU 20 AND A CONSTANT 20 IN TABLES 21 THRU 64. SLOT THREE RECEIVES A CONSTANT 76 IN ALL 64 TABLES.

THE SECOND TIME THRU THE SERIES, TABLES 21 THRU THE END ARE GOING TO BE AFFECTED (NOTE THAT THIS PIECE OF INFORMATION IS PRINTED OUT FOR THE OPERATOR IN THE FORM "UNIT XX" AT THE BEGINNING OF EACH SERIES). QUESTION 1 IS RESPONDED TO BY A <CR>, SO SLOT ONE STAYS AT CONSTANT 75 IN TABLES 21 THRU 64, SINCE NO NEW EXPLICIT VALUES ARE TYPED IN. SLOT TWO GETS THE VALUES 21, 22, 23, ..., 49 IN TABLES 21 THRU 49, AND GETS A 49 IN SLOT 50, AND GETS THE VALUES 51, 52, 53, ..., 64 IN TABLES 51 THRU 64. SLOT THREE GETS THE VALUE 77 IN TABLES 21 THRU 64.

THE DIALOGUE IS TERMINATED WHEN THE SOFTWARE RECOGNIZES THAT 64 EXPLICIT VALUES HAVE BEEN GIVEN FOR AT LEAST ONE QUESTION (NAMELY QUESTION 2).

#### 2.4 EXECUTION TIMES

-----

EYECUT ON TIME IS DEPENDENT ON PROCESSOR NUMBER OF CONTROLLERS AND DRIVES

#### 3.0 ERROR INFORMATION

-----

ALL ERRORS ARE PRINTED VIA CONSOLE DEVICE. THE ERROR INCLUDES ERROR NUMBER, TYPE AND PROGRAM LOCATION. ERRORS INCLUDE REGISTERS BEFORE AND AT ERROR WITH RELEVANT DATA.

#### 3.1 ERROR REPORTING

-----

THE FOLLOWING ARE ERROR HEADINGS THAT MAY BE ENCOUNTERED WHILE RUNNING. A BRIEF DESCRIPTION IS GIVEN.

## SFT ERROR

AN ERROR WAS DISCOVERED, BUT ON RETRY THE ERROR DID NOT PERSIST INFO GIVEN IS ERROR, RLCS, RLBA, AND RLDA

## EXH'D RETRY ON SEEK

THE NUMBER OF RETRIES GIVEN HAVE FAILED TO POSITION DRIVE TO THE GIVEN TRACK INFO GIVEN IS RLCS, RLDA, RLBA, LAST POSITION, PRESENT POSITION, AND DRIVE STATUS

## VOL CHK WILL NOT RESET

A DRIVE RESET WILL NOT RESET VOLUME CHECK BIT

## DR DID NOT REC'R FROM PWR UP

DRIVE DID NOT COME BACK UP AFTER A POWER FAILURE

## DATA DMP - DATA CHECK/GARRBLED DATA

THE PROGRAM ENCOUNTERED A DATA CHECK ERROR BUT WAS UNABLE TO MAKE SENSE OUT OF THE FIRST TWO WORDS, WHICH ARE USED TO KEY OFF OF THEREFORE ALL WORDS OF SECTOR ARE DUMPED (REFER TO SECTION 2 3 13 21)

## LIMITS EXCEEDED' HIGH - Y LOW - Y

ANSWER GIVEN IS NOT WITHIN LIMITS FOR QUESTION

## NO DEFAULT PROVIDED'

CANNOT <CR> TO THIS QUESTION

## ILLEGAL COMMAND

START, RESTART, CONTINUE, PRINT TYPED IN WRONG FORM

## ILLEGAL ENTRY IN P-TABLE

ANSWERS IN HARDWARE SECTION ARE NOT LEGAL  
I.E. MORE THAN TWO CONTROLLERS  
VECTORS FOR A CONTROLLER NOT CONSISTANT  
MORE THAN TWO VECTORS

## CAN'T READ FACTORY BAD SECTOR FILE

PROGRAM IS UNABLE TO READ ANY OF THE FACTORY FILES

## CAN'T READ FIELD BAD SECTOR FILE

PROGRAM IS UNABLE TO READ ANY OF THE FIELD FILES

PLOIK HAS MORE THAN 16 BAD SECTORS

PROGRAM LIMITS EXERCISING CARTRIDGES TO THOSE  
WITH LESS THAN 16 BAD SECTORS

N: DRIVES ENTERED

EITHER NO DRIVES WERE ENTERED OR ALL DRIVES THAT WERE  
ENTERED WERE DROPPED FOR ONE REASON OR ANOTHER THE  
PROGRAM WILL LOOP AFTER PRINTING THE ERROR, WAITING FOR C  
A START COMMAND IS NOW NECESSARY

EP: NOT RDY W/O DRV ERR

ON COMPLETION OF A COMMAND, DRIVE READY IS CHECKED  
FOR A POSSIBLE DRIFT TRACKING PROBLEM IF THERE IS  
NO DRIVE READY A GET STATUS IS DONE TO VERIFY  
THAT THE DRIVE IS NOT IN PROCESS OF SEEKING IF IT  
IS SEEKING THE CONDITION IS LEGAL THIS TYPEOUT  
IMPLIES THERE WERE NO DRIVE ERRORS WHICH MAY HAVE  
FALSIFIED DRIVE READY TO GO AWAY

TR: ERF

THIS ERROR MEANS THAT THE DRIVE IS NO LONGER ON THE  
TRACK WE WERE ON FOR THE LAST READ HEADER PERFORMED  
EACH SEEK IS VERIFIED BY AN IMMEDIATE INITIAL  
READ HEADER. FROM THAT POINT ANY SUBSEQUENT READ  
HEADER, READ OR WRITE WILL PRINT THIS EPROP IF THE  
TRACK IS NOT CORRECT THIS ERROR WILL PRINT THE  
POSITION BEFORE THE LAST SEEK THE PRESENT POSITION  
AND THE EXPECTED POSITION

MIS-ER ERF

AFTER A SEEK WAS DONE, READ HEADER IS DONE TO VERIFY  
THE SEEK THE ERROR PRINTOUT WILL INCLUDE  
THE LAST POSITION BEFORE THE SEEK THE PRESENT POSI-  
TION AND THE EXPECTED POSITION



DCY N HCRC N NXM N HNF H 2  
DLT N OPI N

SEQ 0020

WHERE

HH IS HOURS SINCE START/RESTART  
MM IS MINUTES SINCE START/RESTART  
SS IS SECONDS SINCE START/RESTART  
XXXXXX IS ADDRESS OF CONTROLLER  
Y IS DRIVE NUMBER  
DH IS HOUR AT WHICH DRIVE WAS DROPPED  
DM IS MINUTE AT WHICH DRIVE WAS DROPPED  
NNNNNNNNNN - IS 10 DIGIT OCTAL SERIAL NUMBER OF PACK  
IIII IS TOTAL NUMBER OF SEEKS SINCE 0 00 00  
JJJJ IS TOTAL NUMBER OF BITS READ (\*16) SINCE 0 00 00  
KKKK IS TOTAL NUMBER OF BITS WRITTEN (\*16) SINCE 0 00 00  
N IS NUMBER OF THAT TYPE ERROR SINCE 0 00 00

-----  
REFERENCES REPORTS

THE ONLY PROGRESS REPORT TO THE AUTOMATIC PERFORMANCE REPORT

## 5 0 DEVICE INFORMATION TABLES

THE RL11/RLV11 CONTROLLER HAS THE FOLLOWING FOUR(4)  
REGISTERS FOR CONTROL OF THE SUBSYSTEM

PLCS - CONTROL AND STATUS REGISTER (XXXXX0)

-----  
 BIT 15 - COMPOSITE ERROR  
 BIT 14 - DRIVE ERROR  
 BIT 13 - NON EXISTANT MEMORY ERROR  
 BIT 12 - HEADER NOT FOUND (WITH BIT 10 SET)  
           - DATA LATE (WITH BIT 10 CLEAR)  
 BIT 11 - HEADER CRC (WITH BIT 10 SET)  
           - DATA CRC (WITH BIT 10 CLEAR)  
 BIT 10 - OPERATION INCOMPLETE  
 BIT 9/8 - DRIVE SELECT (0-3)  
 BIT 7 - CONTROLLER READY  
 BIT 6 - INTERRUPT ENABLE  
 BIT 5 - EXTENDED BUS ADDRESS (BIT 17)  
 BIT 4 - EXTENDED BUS ADDRESS (BIT 16)  
 BIT 3-1 - FUNCTION CODE  
           0 - NOP (PDP-11) MAINT (LSI-11)  
           1 - WRITE CHECK  
           2 - GET DRIVE STATUS  
           3 - SEEK  
           4 - READ HEADER  
           5 - WRITE DATA  
           6 - READ DATA  
           7 - READ WITHOUT HEADER COMPARE

BIT 0 - DRIVE READY

PLBA - BUS ADDRESS REGISTER (XXXXX2)

-----  
 BITS 15-1 BUS ADDRESS OF DATA TRANSFER  
 BIT 0 SHOULD BE 0

PLDA - DISK ADDRESS REGISTER (XXXXX4)

-----  
 FOR READ WRITE FUNCTIONS

BIT 15 - MUST BE ZERO(0)  
 BIT 14-7 - CYLINDER ADDRESS FOR TRANSFER  
 BIT 6 - SURFACE FOR TRANSFER  
 BIT 5-0 - SECTOR FOR TRANSFER (0-47)

-----  
 FOR SEEK FUNCTION

BIT 15 - MUST BE ZERO(0)  
 BIT 14-7 - DIFFERENCE TO NEW CYLINDER  
 BIT 6-5 - MUST BE ZERO(0)

BIT 4 - SURFACE  
 BIT 3 - MUST BE ZERO  
 BIT 2 - SEEK DIRECTION( 1 - IN / 0 - OUT )  
 BIT 1 - MUST BE ZERO  
 BIT 0 - MUST BE ONE(1)

FOR GET STATUS FUNCTION  
 -----

BIT 15-4 - IGNORED SHOULD BE ZERO  
 BIT 3 - DRIVE RESET  
 BIT 2 - MUST BE ZERO  
 BIT 1 - MUST BE ONE  
 BIT 0 - MUST BE ONE

PLMP - MULTIPURPOSE REGISTER  
 -----

FOR READ/WRITE FUNCTION  
 -----

BIT 15 - 0 - WORD COUNT(TWO'S COMPLIMENT)

FOR READ HEADER FUNCTION  
 -----

BIT 15-0 - DISK HEADER OF SECTOR (FIRST READ)  
 - ZERO WORD (SECOND READ)  
 - HEADER CRC (THIRD READ)

FOR GET STATUS FUNCTION  
 -----

HAS DRIVE STATUS

BIT 15 - WRITE DATA ERROR  
 BIT 14 - CURRENT HEAD ERROR(CHE)  
 BIT 13 - WRITE LOCK STATUS(WL)  
 BIT 12 - SEEK TIME OUT(SKTO)  
 BIT 11 - SPIN ERROR(SPE)  
 BIT 10 - WRITE GATE ERROR(WGE)  
 BIT 9 - VOLUME CHECK(VC)  
 BIT 8 - DRIVE SELECT ERROR(DSE)  
 BIT 7 - RESERVED(0)  
 BIT 6 - SURFACE  
 BIT 5 - COVER OPEN  
 BIT 4 - HEADS HOME  
 BIT 3 - BRUSHES HOME  
 BIT 2-0 - STATE BITS  
 0 - LOAD STATE  
 1 - SPIN UP  
 2 - BRUSH CYCLE  
 3 - LOAD HEADS  
 4 - SEEK - TRACK COUNTING  
 5 - SEEK - LINEAR MODE  
 6 - UNLOAD HEADS  
 7 - SPIN DOWN



## PROGRAM DESCRIPTION

THE PROGRAM WILL TRY TO SIMULATE A USER ENVIRONMENT WITH RANDOM SELECTION OF DRIVES PERFORMING RANDOM OPERATIONS OF GET STATUS, SEEK, READ AND WRITE

INITIALLY THE BAD SECTOR FILE IS RECOVERED FROM EACH DRIVE AND STORED, THEN EACH PACK IS ENTIRELY WRITTEN RANDOMLY WITH ONE OF EIGHT PREDETERMINED PATTERNS

THE MAIN LOOP IS A CONTINUOUS LOOP OF THE FOLLOWING STEPS

- 1 RANDOMLY SELECT A DRIVE
- 2 CHECK CONTROLLER OF SELECTED DRIVE IS NOT BUSY, THEN STEP 3, ELSE STEP 1
- 3 RANDOMLY SELECT FUNCTION FOR DRIVE  
IF WRITE CHECK NEEDED, THEN STEP 4  
IF SEEK NEEDS VERIFICATION, THEN STEP 12  
IF IN PROCESS OF RETRY, THEN STEP 6  
IF IN PROCESS OF SEEK RETRY, THEN STEP 8  
IF GET STATUS, THEN STEP 5  
IF SEEK, THEN STEP 7  
IF READ, THEN STEP 13  
IF WRITE, THEN STEP 17
- 4 ISSUE WRITE CHECK, GO TO STEP 1
- 5 ISSUE GET STATUS, GO TO STEP 1
- 6 ISSUE LAST FUNCTION, GO TO STEP 1
- 7 GET RANDOM CYLINDER AND HEAD WITHIN SOFTWARE PARAMETER LIMITS
- 8 CALCULATE DIFFERENCE TO NEW POSITION
- 9 ISSUE SEEK
- 10 SET POSITION VERIFICATION NEEDED FLAG
- 11 GO TO STEP 1
- 12 ISSUE READ HEADER, THEN STEP 1
- 13 GET RANDOM WORD COUNT WITHIN LIMITS
- 14 GET RANDOM SECTOR WITHIN LIMITS
- 15 CHECK THAT WORD COUNT AND SECTOR FIT ON TRACK IF THEN STEP 16 ELSE FIX
- 16 ISSUE READ, GO TO STEP 1
- 17 GET RANDOM WORD COUNT WITHIN LIMITS

- 18 GET RANDOM SECTOR WITHIN LIMITS
- 19 CHECK THAT WORD COUNT AND SECTOR FIT  
ON TRACK IF THEN STEP 20; ELSE FIX
- 20 SELECT RANDOM PATTERNS IN 128 WORD CHUNKS UNTIL WORD  
COUNT DONE AND WRITE BUFFER IN MEMORY
- 21 ISSUE WRITE, GO TO STEP 1

THE PROGRAM WILL STAY WITHIN THAT MAIN LOOP UNTIL INTERRUPTED  
OUT BY A FUNCTION FINISHING AT WHICH TIME THE INTERRUPT  
SERVICE ROUTINE WILL START EXECUTION

- 1 READ ALL REGISTERS OF CONTROLLER THAT  
INTERRUPTED AND SAVE IMAGES
- 2 IF NO ERROR SET, THEN STEP 3, ELSE STEP 14
- CHECK FUNCTION WHICH CAUSED INTERRUPT  
IF WRITE CHECK, THEN STEP 3A  
IF GET STATUS, THEN STEP 5  
IF SEEK, THEN STEP 4A  
IF READ HEADER, THEN STEP 7  
IF READ, THEN STEP 9  
IF WRITE, THEN STEP 3B
- 3A CLEAR WRITE CHECK NEEDED FLAG, THEN STEP 4
- 3B SET WRITE CHECK NEEDED FLAG IF REQUESTED THEN STEP 4
- 4 IF RETRY > 0 THEN REPORT SOFT ERROR, ELSE STEP 4A
- 4A EXIT TO MAIN PROGRAM
- 5 CHECK STATUS FOR NO ERRORS  
COVER CLOSED  
BRUSHES HOME  
HEADS OUT  
SEEK LINEAR/TRACKING
- IF THEN STEP 4, ELSE STEP 6
- 6 REPORT STATUS ERROR, GO TO STEP 4A
- 7 SET VERIFICATION DONE FLAG COMPARE PRESENT POSITION  
WITH HEADER WORD IF THEN STEP 4A, ELSE STEP 8
- 8 REPORT MIS-SEEK, SET NEW POSITION, GO TO STEP 4
- 9 IF DATA TO BE COMPARED, THEN STEP 10, ELSE STEP 4
- 10 CHECK VALIDITY OF FIRST TWO WORDS, IF THEN STEP 12,  
ELSE STEP 11
- 11 REPORT GARBLED DATA, GO TO STEP 4
- 12 CHECK WORDS READ IN IF OKAY THEN STEP 4A  
ELSE STEP 13

13 REPORT DATA ERROR, GO TO STEP 4  
 14 IF DRIVE ERROR, THEN STEP 33, ELSE STEP 15  
 15 IF NXM, THEN STEP 18, ELSE STEP 16  
 16 IF OPI, THEN STEP 18, ELSE STEP 17  
 17 IF DLT, THEN STEP 18, ELSE STEP 20  
 18 IF RETRY < LIMIT THEN STEP 4A, ELSE STEP 19  
 19 REPORT HARD ERROR, CLEAR FLAGS, GO TO STEP 4A  
 20 IF MCRC, THEN STEP 24, ELSE STEP 21  
 21 IF DCRC, THEN STEP 29, ELSE STEP 22  
 22 IF HNF, THEN STEP 30, ELSE STEP 23  
 23 YOU SHOULD NEVER GET HERE  
 24 IF DOING READ/WRITE THEN STEP 25  
 IF DOING READ HEADER THEN STEP 26  
 25 CHECK IF DA IS BAD SECTOR THEN STEP 4A, ELSE STEP 18  
 26 READ 40 HEADERS, IF ALL GOOD THEN STEP 27, ELSE STEP 28  
 27 REPORT SOFT HEADER CRC, GO TO 4A  
 28 FIGURE OUT BAD HEADER IF IN FILE THEN STEP 4A, ELSE STEP 18  
 29 CHECK IF DA-1 IS IN FILE IF THEN STEP 4A, ELSE STEP 18  
 30 READ HEADER IF ON CORRECT TRACK THEN STEP  
 31, ELSE STEP 32  
 31 CHECK IF DA IS IN FILE IF THEN STEP 4A ELSE STEP 18  
 32 REPORT TRACKING, FIX POSITION, GO TO STEP 4  
 33 ACT UPON VC  
 SKTO  
 SPE  
 WGE  
 WDE  
 CHE

34 GO TO STEP 4

7 0 PROGRAM LISTING

|      |  |
|------|--|
| 2836 | BIT AND OFFSET DEFINITIONS                               |
| 2978 | GLOBAL DATA AND CONSTANTS                                |
| 3059 | GLOBAL MESSAGES  |
| 3172 | ERROR MESSAGES   |
| 3348 | SOFTWARE PARAMETERS                                      |
| 3396 | STATISTIC CODE   |
| 3424 | INITIALIZATION CODE                                      |
| 3711 | GLOBAL SUBROUTINES                                       |
| 3792 | PROGRAM MAIN LOOP  |
| 3984 | ROUTINE TO SETUP AND ISSUE GET STATUS                    |
| 3992 | ROUTINE TO SETUP AND ISSUE SEEK FUNCTION                 |
| 4069 | ROUTINE TO LOAD READ HEADER AND ISSUE IT                 |
| 4077 | ROUTINE TO LOAD WRITE DATA COMMAND                       |
| 4099 | ROUTINE TO LOAD READ DATA COMMAND                        |
| 4117 | SETUP CONTROLLER AND DRIVE INFO FOR INTERRUPT PROCESSING |
| 4175 | ROUTINE TO LOAD FUNCTION                                 |
| 4158 | INTERRUPT SERVICE ROUTINES                               |
| 4227 | CONTROLLER ERROR CHECK ROUTINE                           |
| 4457 | COMMAND SERVICE ROUTINES                                 |
| 4488 | SEEK   |
| 4498 | READ   |
| 4516 | READ HEADER  |
| 4550 | GET STATUS   |
| 4575 | WRITE  |
| 4633 | DRIVE ERROR SERVICE                                      |
| 4783 | RETRY LIMIT ROUTINE                                      |
| 4794 | LIST OF FUNCTION ROUTINES                                |
| 4807 | BAD SECTOR FILE ROUTINE                                  |
| 4924 | ROUTINE TO DROP DRIVE                                    |
| 4968 | ROUTINE TO CHECK DATA                                    |
| 5050 | ROUTINE TO WAIT FOR CONTROLLER READY                     |
| 5073 | GET STATUS/DRIVE RESET ROUTINE                           |
| 5094 | ROUTINE TO GENERATE A RANDOM NUMBER                      |
| 5120 | ROUTINE TO WRITE PACKS INITIALLY                         |
| 5298 | ROUTINE FOR SYSTEM CLOCK                                 |
| 5327 | HEADS HOME ROUTINE                                       |
| 5348 | RANDOM WC AND DA ROUTINE                                 |
| 5408 | ROUTINE TO DUMP BUFFER ON DCA                            |
| 5557 | ROUTINE TO CHECK FOR BAD SECTOR                          |
| 5757 | DRIVE INFORMATION BUFFERS                                |

|      |        |        |                  |  |
|------|--------|--------|------------------|--|
| 2806 |        |        | ENABLE AMA       |  |
| 2807 |        |        | ENABLE ABS       |  |
| 2808 |        |        | NLIST ME,CND,MD  |  |
| 2809 |        |        |                  |  |
| 2810 | 002000 |        | =2000            |  |
| 2811 |        |        |                  |  |
| 2812 |        |        |                  |  |
| 2814 |        |        |                  |  |
| 2815 | 002000 |        | SVC              |  |
| 2816 | 000000 |        | SVCINS=0         |  |
| 2817 | 000000 |        | SVCTAG=0         |  |
| 2818 |        |        |                  |  |
| 2819 |        |        |                  |  |
| 2820 |        |        |                  |  |
| 2821 | 002000 |        | POINTER ALL      |  |
| 2822 |        |        |                  |  |
| 2823 |        |        |                  |  |
| 2824 | 002000 |        | BGNMOD MDHDR     |  |
| 2825 | 002000 |        | HEADER DZRLE,A,0 |  |
| (5)  | 002000 | 104    | ASCII @D@        |  |
| (5)  | 002001 | 132    | ASCII @Z@        |  |
| (5)  | 002002 | 122    | ASCII @R@        |  |
| (5)  | 002003 | 114    | ASCII @L@        |  |
| (5)  | 002004 | 105    | ASCII @E@        |  |
| (6)  | 002005 | 000    | BYTE 0           |  |
| (6)  | 002006 | 000    | BYTE 0           |  |
| (5)  | 002007 | 000    | BYTE 0           |  |
| (4)  | 002010 | 101    | ASCII @A@        |  |
| (4)  | 002011 | 060    | ASCII @0@        |  |
| (4)  | 002012 | 001    | BYTE C\$REVISION |  |
| (3)  | 002013 | 006    | BYTE C\$EDIT     |  |
| (4)  | 002014 | 000000 | WORD 0           |  |
| (4)  | 002016 | 000000 | WORD             |  |
| (4)  | 002020 | 000000 | WORD             |  |
| (4)  | 002022 | 000000 | WORD             |  |
| (4)  | 002024 | 000000 | WORD 0           |  |
| (5)  | 002026 | 000000 | WORD 0           |  |
| (4)  | 002030 | 000000 | WORD 0           |  |
| (4)  | 002032 | 000000 | WORD 0           |  |
| (4)  | 002034 | 000000 | WORD 0           |  |
| (4)  | 002036 | 000000 | WORD 0           |  |
| (4)  | 002040 | 007570 | WORD L\$DISPATCH |  |
| (4)  | 002042 | 007650 | WORD L\$INIT     |  |
| (4)  | 002044 | 011050 | WORD L\$CLEAN    |  |
| (4)  | 002046 | 026176 | WORD L\$SHARD    |  |
| (4)  | 002050 | 026322 | WORD L\$SOFT     |  |
| (4)  | 002052 | 002104 | WORD L\$DUTYP    |  |
| (4)  | 002054 | 007572 | WORD L\$SRPT     |  |
| (4)  | 002056 | 007454 | WORD L\$HW       |  |
| (4)  | 002060 | 007470 | WORD L\$SW       |  |
| (4)  | 002062 | 002102 | WORD L\$DR       |  |
| (4)  | 002064 | 002102 | WORD L\$DRST     |  |
| (4)  | 002066 | 000000 | WORD 0           |  |
| (4)  | 002070 | 011202 | WORD L\$AU       |  |
| (4)  | 002072 | 011266 | WORD L\$DU       |  |
| (4)  | 002074 | 000000 | WORD 0           |  |

|      |        |        |        |     |        |         |
|------|--------|--------|--------|-----|--------|---------|
| (4)  | 002076 | 027706 |        |     | WORD   | L\$LAST |
| 2826 |        |        |        |     |        |         |
| 2827 | 002100 |        |        |     | ENDMOD |         |
| 2828 |        |        |        |     |        |         |
| 2829 |        |        |        |     |        |         |
| 2830 |        |        |        |     |        |         |
| 2831 | 002100 |        |        |     | DEVREG |         |
| (5)  | 002100 | 000000 |        |     | WORD   | 0       |
| (2)  | 002102 | 000001 |        |     | BLKW   |         |
| 2832 |        |        |        |     |        |         |
| 2833 | 002104 |        |        |     | DEVTYP | <RLO1>  |
| (3)  | 002104 | 046122 | 030460 | 000 | ASCIZ  | @RLO1@  |
| (1)  |        | 002112 |        |     | EVEN   |         |

SBTT. BIT AND OFFSET DEFINITIONS

DEFINITIONS

|      |        |  |  |  |        |         |
|------|--------|--|--|--|--------|---------|
| 2841 | 002112 |  |  |  | BGNMOD | GLBEQAT |
|------|--------|--|--|--|--------|---------|

|      |        |  |  |  |        |  |
|------|--------|--|--|--|--------|--|
| 2843 | 002112 |  |  |  | EQUALS |  |
|------|--------|--|--|--|--------|--|

BIT DEFINITIONS

|     |  |        |  |  |         |        |
|-----|--|--------|--|--|---------|--------|
| (1) |  |        |  |  | BIT15== | 100000 |
| (1) |  | 100000 |  |  | BIT14== | 40000  |
| (1) |  | 040000 |  |  | BIT13== | 20000  |
| (1) |  | 020000 |  |  | BIT12== | 10000  |
| (1) |  | 010000 |  |  | BIT11== | 4000   |
| (1) |  | 004000 |  |  | BIT10== | 2000   |
| (1) |  | 002000 |  |  | BIT09== | 1000   |
| (1) |  | 001000 |  |  | BIT08== | 400    |
| (1) |  | 000400 |  |  | BIT07== | 200    |
| (1) |  | 000200 |  |  | BIT06== | 100    |
| (1) |  | 000100 |  |  | BIT05== | 40     |
| (1) |  | 000040 |  |  | BIT04== | 20     |
| (1) |  | 000020 |  |  | BIT03== | 10     |
| (1) |  | 000010 |  |  | BIT02== | 4      |
| (1) |  | 000004 |  |  | BIT01== | 2      |
| (1) |  | 000002 |  |  | BIT00== | 1      |
| (1) |  | 000001 |  |  |         |        |
| (1) |  |        |  |  | BIT9==  | BIT09  |
| (1) |  | 001000 |  |  | BIT8==  | BIT08  |
| (1) |  | 000400 |  |  | BIT7==  | BIT07  |
| (1) |  | 000200 |  |  | BIT6==  | BIT06  |
| (1) |  | 000100 |  |  | BIT5==  | BIT05  |
| (1) |  | 000040 |  |  | BIT4==  | BIT04  |
| (1) |  | 000020 |  |  | BIT3==  | BIT03  |
| (1) |  | 000010 |  |  | BIT2==  | BIT02  |
| (1) |  | 000004 |  |  | BIT1==  | BIT01  |
| (1) |  | 000002 |  |  | BIT0==  | BIT00  |
| (1) |  | 000001 |  |  |         |        |

EVENT FLAG DEFINITIONS

EF32, EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION

BIT AND OFFSET DEFINITIONS

SEQ 0030

EF16 EFO1 AVAILABLE FOR PROGRAM USE

|     |        |               |    |
|-----|--------|---------------|----|
| (1) |        |               |    |
| (1) | 000040 | EF START==    | 32 |
| (1) | 000037 | EF RESTART==  | 31 |
| (1) | 000036 | EF CONTINUE== | 30 |
| (1) | 000035 | EF NEW==      | 29 |
| (1) | 000034 | EF PWR==      | 28 |
| (1) |        |               |    |
| (1) | 000020 | EF16==        | 16 |
| (1) | 000017 | EF15==        | 15 |
| (1) | 000016 | EF14==        | 14 |
| (1) | 000015 | EF13==        | 13 |
| (1) | 000014 | EF12==        | 12 |
| (1) | 000013 | EF11==        | 11 |
| (1) | 000012 | EF10==        | 10 |
| (1) | 000011 | EFO9==        | 9  |
| (1) | 000010 | EFO8==        | 8  |
| (1) | 000007 | EFO7==        | 7  |
| (1) | 000006 | EFO6==        | 6  |
| (1) | 000005 | EFO5==        | 5  |
| (1) | 000004 | EFO4==        | 4  |
| (1) | 000003 | EFO3==        | 3  |
| (1) | 000002 | EFO2==        | 2  |
| (1) | 000001 | EFO1==        | 1  |

START COMMAND WAS ISSUED  
 RESTART COMMAND WAS ISSUED  
 CONTINUE COMMAND WAS ISSUED  
 A NEW PASS HAS BEEN STARTED  
 A POWER-FAIL/POWER-UP OCCURRED

PRIORITY LEVEL DEFINITIONS

|     |        |         |     |
|-----|--------|---------|-----|
| (1) | 000340 | PR107== | 340 |
| (1) | 000300 | PR106== | 300 |
| (1) | 000240 | PR105== | 240 |
| (1) | 000200 | PR104== | 200 |
| (1) | 000140 | PR103== | 140 |
| (1) | 000100 | PR102== | 100 |
| (1) | 000040 | PR101== | 40  |
| (1) | 000000 | PR100== | 0   |

|      |        |      |                           |
|------|--------|------|---------------------------|
| 2844 |        | CS=0 | CONTROL AND STATUS OFFSET |
| 2845 | 000000 | BA=2 | BUSADDRESS OFFSET         |
| 2846 | 000002 | DA=4 | DISK ADDRESS OFFSET       |
| 2847 | 000004 | MP=6 | MULTI PURPOSE OFFSET      |
| 2848 | 000006 |      |                           |

CONSTANT OFFSETS FOR INDIVIDUAL DRIVE BUFFERS  
 THE ONLY POSITION THAT IS CRITICAL IS THAT OF  
 "PRPOS" IT MUST BE THE LAST ENTRY OF THE BUFFER

|      |        |           |  |
|------|--------|-----------|--|
| 2853 | 000000 | SACNT=0   | SEEK OPERATION COUNT                   |
| 2854 | 000002 | RXFR1=2   | READ OPERATION COUNT (BITS) LOW ORDER  |
| 2855 | 000004 | RXFR2=4   | " " " " HIGH ORDER                     |
| 2856 | 000006 | WXFR1=6   | WRITE OPERATION COUNT (BITS) LOW ORDER |
| 2857 | 000010 | WXFR2=10  | " " " " HIGH ORDER                     |
| 2858 | 000012 | ERRCNT=12 | ERROR COUNT - HARD                     |
| 2859 | 000014 | SFTCNT=14 | ERROR COUNT - SOFT                     |
| 2860 | 000016 | SKECNT=16 | SEEK ERROR COUNT                       |
| 2861 | 000020 | DEPCNT=20 | DRIVE ERROR COUNT                      |
| 2862 | 000022 | DCRCER=22 | DATA CRC ERROR COUNT                   |
| 2863 | 000024 | HCRCER=24 | HEADER CRC ERROR COUNT                 |

BIT AND OFFSET DEFINITIONS

|      |        |            |  |
|------|--------|------------|--|
| 2864 | 000026 | DLTCNT=26  | . DATA LATE ERROR COUNT                  |
| 2865 | 000030 | OPICNT=30  | . OPERATION INCOMPLETE ERROR COUNT       |
| 2866 | 000032 | HNFERR=32  | . HEADER NOT FOUND ERROR COUNT           |
| 2867 | 000034 | NXM CNT=34 | . NON EXISTANT MEMORY ERROR COUNT        |
| 2868 | 000036 | RETRY=36   | . PRESENT RETRY NUMBER                   |
| 2869 | 000040 | BDA=40     | . " DISK ADDRESS CONTENTS                |
| 2870 | 000042 | BMP=42     | . PRESENT MULTIPURPOSE CONTENTS          |
| 2871 | 000044 | FUNC=44    | . LAST FUNCTION LOADED                   |
| 2872 | 000046 | BCSADR=46  | . CSR IMAGE OF LAST COMMAND              |
| 2873 | 000050 | LSTHDR=50  | . LAST POSITION ON DISK                  |
| 2874 | 000052 | RTYPE=52   | . ERROR ON WHICH RECOVERY IS BEING TRIED |
| 2875 | 000054 | SKCNT1=54  | . LOW SEEK COUNT                         |
| 2876 | 000056 | PRFLGS=56  | . INTERNAL FLAGS                         |
| 2877 | 000060 | RXFR3=60   | . THIRD ORDER READ COUNT                 |
| 2878 | 000062 | WXFR3=62   | . THIRD ORDER WRITE COUNT                |
| 2879 | 000064 | LSTDA=64   | . DISK ADDRESS AT SOFT ERROR             |
| 2880 | 000066 | DIFWD=66   | . LAST DIFFERENCE WORD OF SEEK           |
| 2881 | 000070 | DPHOUR=70  | . HOUR OF DRIVE DROPPED                  |
| 2882 | 000071 | DPMIN=71   | . MINUTE OF DRIVE DROPPED                |
| 2883 | 000072 | TRERR=72   | . TRACKING ERRORS COUNT                  |
| 2884 | 000074 | DATCER=74  | . DATA CMP ERRORS                        |
| 2885 | 000076 | DOWCK=76   | . PERFORM WRITE CHECK                    |
| 2886 | 000100 | SERNM1=100 | . SERIAL NUMBER OF CARTRIDGE             |
| 2887 | 000102 | SERNM2=102 | . SERIAL NUMBER OF CARTRIDGE             |
| 2888 | 000104 | DCS=104    | . CSR ADDRESS                            |
| 2889 | 000106 | DRSEL=106  | . DRIVE SELECT BITS(8,9,10)              |
| 2890 | 000110 | BBA=110    | . PRESENT BUS ADDRESS CONTENTS           |
| 2891 | 000112 | BSECTP=112 | . POINTER TO BAD SECTOR FILE             |
| 2892 | 000114 | RSEEK=114  | . SEEK IN PROCESS OF RECOVERY            |
| 2893 | 000116 | SOFTCS=116 | . CSR OF SOFT ERROR                      |
| 2894 | 000120 | PRPOS=120  | . PRESENT POSITION ON DISK               |
| 2895 |        |            |  |
| 2896 | 000001 | SKDON=BIT0 | . DRIVE READY                            |
| 2897 | 000001 | DRDY=BIT0  | . INTERRUPT ENABLE                       |
| 2898 | 000100 | INTEN=BIT6 | . COMPOSITE ERROR                        |
| 2899 | 100000 | ERR=BIT15  | . DRIVE ERROR                            |
| 2900 | 040000 | DEPR=BIT14 | . WRITE DATA ERROR                       |
| 2901 | 100000 | WDE=BIT15  | . HEAD CURRENT ERROR                     |
| 2902 | 040000 | HCE=BIT14  | . WRITE LOCK                             |
| 2903 | 020000 | WL=BIT13   | . SEEK TIMEOUT ERROR                     |
| 2904 | 010000 | SFTO=BIT12 | . SPINDLE TIMEOUT/UNDER OVER SPEED       |
| 2905 | 004000 | SPE=BIT11  | . WRITE GATE ERROR                       |
| 2906 | 002000 | WGE=BIT10  | . VOLUME CHECK                           |
| 2907 | 001000 | VC=BIT9    | . DRIVE SELECT ERROR                     |
| 2908 | 000400 | DSE=BIT8   | . NON-EXISTANT MEMORY ERROR              |
| 2909 | 020000 | NXM=BIT13  | . DATA LATE                              |
| 2910 | 010000 | DLT=BIT12  | . DATA CRC ERROR                         |
| 2911 | 004000 | DCRC=BIT11 | . HEADER CRC ERROR                       |
| 2912 | 004000 | HCRC=BIT11 | . HEADER NOT FOUND ERROR                 |
| 2913 | 010000 | HNF=BIT12  | . OPERATION INCOMPLETE ERROR             |
| 2914 | 002000 | OPI=BIT10  | . CONTROLLER READY                       |
| 2915 | 000200 | CRDY=BIT7  | . EXTENDED BUS ADDRESS BIT 17            |
| 2916 | 000040 | BA17=BIT5  | . EXTENDED BUS ADDRESS BIT 16            |
| 2917 | 000020 | BA16=BIT4  | . WRITE CHECK FUNCTION CODE              |
| 2918 | 000002 | WCHK=BIT1  | . GET DRIVE STATUS FUNCTION CODE         |
| 2919 | 000004 | GSTAT=BIT2 |  |

BIT AND OFFSET DEFINITIONS

|      |        |                     |  |
|------|--------|---------------------|--|
| 2920 | 000006 | SEEK=BIT1'BIT2      | , SEEK FUNCTION CODE                                   |
| 2921 | 000010 | RDHDR=BIT3          | , READ HEADER FUNCTION CODE                            |
| 2922 | 000012 | WRITE=BIT3'BIT1     | , WRITE FUNCTION CODE                                  |
| 2923 | 000014 | READ=BIT3'BIT2      | , READ FUNCTION CODE                                   |
| 2924 | 000013 | DRST=BIT3'BIT1'BIT0 | , DRIVE RESET COMMAND CODE FOR DRIVE COMMAND WORD      |
| 2925 | 000003 | GSBIT=BIT1'BIT0     | , GET STATUS COMMAND CODE FOR DRIVE COMMAND WORD       |
| 2926 | 000001 | MK=BIT0             | , MARKER BIT FOR DRIVE COMMAND WORD (SEEK, GET STATUS) |
| 2927 | 000004 | SIGN=BIT2           | , DIRECTION FOR SEEK (0=AWAY FROM SPINDLE)             |
| 2928 | 000020 | SKHS=BIT4           | , HEAD SELECT FOR SEEK                                 |
| 2929 | 000100 | HEAD=BIT6           | , HEAD SELECT FOR READ, WRITE, GET STATUS              |

. OFFSET FOR HARDWARE P-TABLE

|      |        |         |
|------|--------|---------|
| 2930 | 000000 | CSR=0   |
| 2931 | 000002 | VECT=2  |
| 2932 | 000004 | PRIOR=4 |
| 2933 | 000006 | DRBT=6  |
| 2934 | 000010 | CNT=10  |

. OFFSET FOR SOFTWARE P-TABLE

|      |        |          |
|------|--------|----------|
| 2940 |        | RLT=0    |
| 2941 | 000000 | ELT=2    |
| 2942 | 000002 | SET=4    |
| 2943 | 000004 | DAT=6    |
| 2944 | 000006 | SFT=10   |
| 2945 | 000010 | TYT=12   |
| 2946 | 000012 | RDT=14   |
| 2947 | 000014 | DDT=16   |
| 2948 | 000016 | CHFLG=20 |
| 2949 | 000020 | MYB=22   |
| 2950 | 000022 | MXH=24   |
| 2951 | 000024 | MNH=26   |
| 2952 | 000026 | MXC=30   |
| 2953 | 000030 | MNC=32   |
| 2954 | 000032 | MXS=34   |
| 2955 | 000034 | MNS=36   |
| 2956 | 000036 | DCKFG=40 |
| 2957 | 000040 | DPFLG=42 |
| 2958 | 000042 | MNB=44   |
| 2959 | 000044 | SEL=46   |
| 2960 | 000046 | OPFLG=50 |
| 2961 | 000050 | DET=52   |
| 2962 | 000052 | RCF=54   |
| 2963 | 000054 | PAN=56   |
| 2964 | 000056 | PAT=60   |
| 2965 | 000060 | SRLT=62  |
| 2966 | 000062 | CLMT=64  |
| 2967 | 000064 | AUTO=66  |
| 2968 | 000066 | STIP=70  |
| 2969 | 000070 | WCF=72   |
| 2970 | 000072 | CCO=74   |
| 2971 | 000074 |          |

002112

ENDMOD

2974  
2975

BIT AND OFFSET DEFINITIONS

| Address | Label  | Value  | Field    | Size   | Offset | Description                                     |
|---------|--------|--------|----------|--------|--------|---|
| 2976    |        |        |          |        |        |   |
| 2977    |        |        |          |        |        |   |
| 2978    |        |        |          |        |        |   |
| 2979    |        |        |          |        |        |   |
| 2980    | 002112 |        | BGNMOD   | GLBDAT |        |   |
| 2981    |        |        |          |        |        |   |
| 2982    | 002112 | 000000 | RECNT    | WORD   | 0      | . READ ERROR COUNT                              |
| 2983    | 002114 | 000000 | RWCNT    | WORD   | 0      | . R/W ERROR COUNT                               |
| 2984    | 002116 | 000000 | WHY      | WORD   | 0      | . REASON FOR DROPPING DRIVE                     |
| 2985    | 002120 | 000    | DRUT     | BYTE   | 0      | . DRIVES UNDER TEST                             |
| 2986    | 002121 | 000    | DRPRS    | BYTE   | 0      | . DRIVES PRESENT                                |
| 2987    | 002122 | 000000 | SYMSK    | WORD   | 0      | . MASK FOR 0-7 DRIVES                           |
| 2988    | 002124 | 176543 | HINUM    | WORD   | 176543 | . PRIME FOR RANDOM                              |
| 2989    | 002126 | 123456 | LONUM    | WORD   | 123456 | . NUMBER GENERATOR                              |
| 2990    | 002130 | 100177 | CYLSK    | WORD   | 100177 | . MASK FOR CYLINDER ONLY                        |
| 2991    | 002132 | 100077 | SEMSK    | WORD   | 100077 | . MASK OUT SECTOR BITS                          |
| 2992    |        |        |          |        |        |   |
| 2993    |        |        |          |        |        |   |
| 2994    |        |        |          |        |        |   |
| 2995    |        |        |          |        |        |   |
| 2996    | 002134 | 174400 | JNTR1    | WORD   | 174400 | . CSR OF CONTROLLER 1 (LUN 0-3)                 |
| 2997    | 002136 | 000000 | JNTR2    | WORD   | 0      | . CSR OF CONTROLLER 2 (LUN 4-7)                 |
| 2998    | 002140 | 000000 | LSTOR1   | WORD   | 0      | . BUFFER POINTER OF DRIVE                       |
| 2999    | 002142 | 000000 | LSTOR2   | WORD   | 0      | . BUFFER POINTER OF DRIVE                       |
| 3000    | 002144 | 000000 | BCSR     | WORD   | 0      | . CSR FROM P-TABLE                              |
| 3001    | 002146 | 000000 | BVEC     | WORD   | 0      | . VECTOR " "                                    |
| 3002    | 002150 | 000000 | BPR10P   | WORD   | 0      |   |
| 3003    | 002152 | 000000 | BDRSEL   | WORD   | 0      | . DRIVE " "                                     |
| 3004    | 002154 | 000000 | HDPEND   | WORD   | 0      | . FLAG TO INDICATE HDP IN BAD LIST              |
| 3005    | 002156 | 000000 | CHKSEC   | WORD   | 0      | . SECTOR OF ERROR - USED BY BAD SECTOR LOCATION |
| 3006    | 002160 | 000000 | DECNT    | WORD   | 0      | . DATA ERROR COUNT                              |
| 3007    | 002162 | 000000 | TEMP0    | WORD   | 0      | . TEMP LOCATION                                 |
| 3008    | 002164 | 000000 | TEMP1    | WORD   | 0      | . TEMP LOCATION                                 |
| 3009    | 002166 | 000000 | TEMP2    | WORD   | 0      | . TEMP LOCATION                                 |
| 3010    | 002170 | 000000 | TEMP3    | WORD   | 0      | . " "   |
| 3011    | 002172 | 000000 | TEMP4    | WORD   | 0      | . " "   |
| 3012    | 002174 | 000000 | TEMP5    | WORD   | 0      | . " "   |
| 3013    | 002176 | 000000 | TEMP6    | WORD   | 0      | . " "   |
| 3014    | 002200 | 000000 | TEMP7    | WORD   | 0      | . " "   |
| 3015    | 002202 | 000000 | TEMP8    | WORD   | 0      | . " "   |
| 3016    | 002204 | 000000 | TEMP9    | WORD   | 0      | . " "   |
| 3017    | 002206 | 000330 | VECT1    | WORD   | 330    | . VECTOR OF FIRST CONTROLLED                    |
| 3018    | 002210 | 000000 | VECT2    | WORD   | 0      | . VECTOR " 2ND                                  |
| 3019    | 002212 | 000000 | PRIOR1   | WORD   | 0      |   |
| 3020    | 002214 | 000000 | PRIOR2   | WORD   | 0      |   |
| 3021    | 002216 | 000000 | GDDAT    | WORD   | 0      |   |
| 3022    | 002220 | 000000 | RNTEMP   | WORD   | 0      |   |
| 3023    | 002222 | 000000 | INTERVAL | WORD   | 0      | . TIME BETWEEN REPORTS                          |
| 3024    | 002224 | 000000 | LSTTIM   | WORD   | 0      | . LAST TIME ON SYSTEM CLOCK                     |
| 3025    | 002226 | 000000 | SECOND   | WORD   | 0      | . SECONDS OF SYSTEM CLOCK                       |
| 3026    | 002230 | 000000 | MINUTE   | WORD   | 0      | . MINUTES OF SYSTEM CLOCK                       |
| 3027    | 002232 | 000000 | HOUR     | WORD   | 0      | . HOURS OF SYSTEM CLOCK                         |
| 3028    | 002234 | 000000 | ECS      | WORD   | 0      | . PAGES OF REGISTERS                            |
| 3029    | 002236 | 000000 | EBA      | WORD   | 0      | . ON INTERRUPT                                  |
| 3030    | 002240 | 000000 | EQA      | WORD   | 0      |   |
| 3031    | 002242 | 000000 | EMF      | WORD   | 0      |   |

THE FOLLOWING LOCATIONS ARE CLEARED AS A GROUP (DOWN TO 'STFLG')  
 THEREFORE DON'T INSERT ANY CONSTANTS

|      |        |        |        |        |                       |       |                        |  |
|------|--------|--------|--------|--------|-----------------------|-------|------------------------|--|
| 3032 | 002244 | 000000 |        |        | E MP1                 | WORD  | 0                      |  |
| 3033 | 002246 | 000000 |        |        | E MP2                 | WORD  | 0                      |  |
| 3034 | 002250 | 000000 |        |        | SYSCLK                | WORD  | 0                      | . FLAG INDICATING PRESENCE OF SYSTEM CLOCK |
| 3035 | 002252 | 000000 |        |        | BUF1                  | WORD  | 0                      | . BUFFER FOR FIRST CONTROLLER              |
| 3036 | 002254 | 000000 |        |        | BUF2                  | WORD  | 0                      | . BUFFER FOR SECOND CONTROLLER             |
| 3037 | 002256 | 000000 |        |        | MAXWC                 | WORD  | 0                      | . MAX WORD COUNT DETERMINED BY CORE        |
| 3038 | 002260 | 000000 |        |        | UUT                   | WORD  | 0                      | . NUMBER OF UNITS ON SYSTEM                |
| 3039 | 002262 | 000000 |        |        | PWRFLG                | WORD  | 0                      | . POWER FAIL INDICATOR                     |
| 3040 | 002264 | 000000 |        |        | TRPFLG                | WORD  | 0                      | . TRAP OCCURANCE FLAG                      |
| 3041 | 002266 | 000000 |        |        | STFLG                 | WORD  | 0                      | . START FLAG                               |
| 3042 |        |        |        |        |                       |       |                        |  |
| 3043 |        |        |        |        | . END OF MASS CLEAR   |       |                        |  |
| 3044 |        |        |        |        |                       |       |                        |  |
| 3045 | 002270 | 000000 |        |        | CNTFLG                | WORD  | 0                      | . CONTINUE FLAG                            |
| 3046 | 002272 | 000000 |        |        | FASCII                | WORD  | 0                      | . ASCII MESSAGE OF FUNCT CN                |
| 3047 | 002274 | 000000 |        |        | FASPNT                | WORD  | 0                      | . POINTER                                  |
| 3048 | 002276 | 000000 |        |        | DWCNT                 | WORD  | 0                      | . ERROR COUNT                              |
| 3049 | 002300 | 000000 |        |        | DWCNT1                | WORD  | 0                      | . ERROR COUNT                              |
| 3050 | 002302 | 000004 |        |        | ERRVEC                | WORD  | 4                      | . ERROR VECTOR                             |
| 3051 | 002304 | 000034 |        |        | ST1                   | WORD  | 34                     | . STATES ALLOWED                           |
| 3052 | 002306 | 000035 |        |        | ST2                   | WORD  | 35                     | . STATES ALLOWED                           |
| 3053 | 002310 | 000000 |        |        | SPECIAL               | WORD  | 0                      |  |
| 3054 | 002312 | 000000 |        |        | NCALL                 | WORD  | 0                      |  |
| 3055 |        |        |        |        |                       |       |                        |  |
| 3056 | 002314 |        |        |        | ENEMOD                |       |                        |  |
| 3057 |        |        |        |        |                       |       |                        |  |
| 3058 |        |        |        |        |                       |       |                        |  |
| 3059 |        |        |        |        | SBTTL GLOBAL MESSAGES |       |                        |  |
| 3060 |        |        |        |        |                       |       |                        |  |
| 3061 | 002314 |        |        |        | BGNMOD GLBTXT         |       |                        |  |
| 3062 |        |        |        |        |                       |       |                        |  |
| 3063 |        |        |        |        | GLOBAL TEXT           |       |                        |  |
| 3064 |        |        |        |        |                       |       |                        |  |
| 3065 |        |        |        |        |                       |       |                        |  |
| 3069 |        |        |        |        |                       |       |                        |  |
| 3070 | 002314 | 044524 | 042515 | 020072 | TIME                  | ASCIZ | "TIME "                |  |
| 3071 | 002323 | 040    | 046122 | 051503 | MRLCS                 | ASCIZ | " RLCS "               |  |
| 3072 | 002333 | 040    | 051050 | 041514 | CRLCS                 | ASCIZ | " (RLCS) "             |  |
| 3073 | 002345 | 040    | 052506 | 041516 | MFUNC                 | ASCIZ | " FUNCTION "           |  |
| 3074 | 002361 | 040    | 051050 | 041114 | CPLBA                 | ASCIZ | " (RLBA) "             |  |
| 3075 | 002373 | 040    | 051050 | 042114 | CPLDA                 | ASCIZ | " (RLDA) "             |  |
| 3076 | 002405 | 040    | 051050 | 046514 | CPLMP                 | ASCIZ | " (RLMP) "             |  |
| 3077 |        |        |        |        |                       |       |                        |  |
| 3078 | 002417 | 104    | 043111 | 053440 | DIFMSG                | ASCIZ | /DIF WD                |  |
| 3079 | 002430 | 040520 | 045503 | 051440 | CART                  | ASCIZ | /PACK SERIAL #         |  |
| 3080 | 002450 | 047516 | 041440 | 042122 | NOCRDY                | ASCIZ | /NO CRDY/              |  |
| 3081 | 002460 | 051104 | 047040 | 052117 | DNRDY                 | ASCIZ | /DR NOT RDY            |  |
| 3082 | 002473 | 104    | 020122 | 047516 | NORDY                 | ASCIZ | /DR NOT RDY W/O CR ERR |  |
| 3083 | 002521 | 102    | 043525 | 000    | PRGER                 | ASCIZ | /BUG/                  |  |
| 3084 | 002525 | 111    | 044516 | 020124 | NWRTS                 | ASCIZ | /INIT WR OF SEC BAG    |  |
| 3085 | 002550 | 051440 | 041505 | 047524 | SMSG                  | ASCIZ | / SECTOR /             |  |
| 3086 | 002562 | 047516 | 043440 | 047517 | EXHAUS                | ASCIZ | /NO GOOD HDR/          |  |
| 3087 | 002576 | 047125 | 044504 | 043501 | UDERR                 | ASCIZ | /UNDIAGNOSABLE ERR     |  |
| 3088 | 002620 | 042523 | 045505 | 042440 | MSKER                 | ASCIZ | /SEEK ERR/             |  |
| 3089 | 002631 | 123    | 043117 | 020124 | MSFER                 | ASCIZ | /SOFT ERR ENCL         |  |
| 3090 | 002650 | 051104 | 042440 | 051122 | DRVER                 | ASCIZ | /DR ERR/               |  |

|      |        |        |        |        |        |       |                                |
|------|--------|--------|--------|--------|--------|-------|--------------------------------|
| 3091 | 002657 | 104    | 020122 | 051105 | MDERS  | ASCIZ | /DR ERR WILL NOT RESET/        |
| 3092 | 002705 | 104    | 020122 | 052123 | MDSER  | ASCIZ | /DR STAT ERR/                  |
| 3093 | 002721 | 126    | 046117 | 041440 | MVCER  | ASCIZ | /VOL CHK WILL NOT CLR/         |
| 3094 | 002746 | 051127 | 043440 | 052101 | WGEST  | ASCIZ | /WR GATE ERR WILL NOT RESET/   |
| 3095 | 003001 | 104    | 020122 | 051105 | MRDER  | ASCIZ | /DR ERR - RECOVERED/           |
| 3096 | 003024 | 040504 | 040524 | 041440 | MDCER  | ASCIZ | /DATA CMP ERR/                 |
| 3097 | 003041 | 110    | 051101 | 020104 | MHDR   | ASCIZ | /HARD ERROR/                   |
| 3098 | 003054 | 040504 | 040524 | 042040 | DMPDCK | ASCIZ | /DATA DUMP - DCK/              |
| 3099 | 003074 | 051124 | 041501 | 044513 | TRACK  | ASCIZ | /TRACKING ERR/                 |
| 3100 | 003111 | 110    | 042122 | 042440 | ERLMTM | ASCIZ | /HRD ERR LMT EXC'D/            |
| 3101 | 003133 | 123    | 020113 | 051105 | SERLMT | ASCIZ | /SK ERR LMT EXC'D/             |
| 3102 | 003154 | 043123 | 020124 | 051105 | SFMSG  | ASCIZ | /SFT ERR LMT EXC'D/            |
| 3103 | 003176 | 040504 | 040524 | 042440 | DCMSG  | ASCIZ | /DATA ERR LMT EXC'D/           |
| 3104 | 003221 | 104    | 020122 | 051105 | DERMSG | ASCIZ | /DR ERR LMT EXC'D/             |
| 3105 | 003242 | 052502 | 043106 | 051105 | OVER   | ASCIZ | /BUFFER CHOSEN TOO BIG - WAS   |
| 3106 | 003277 | 122    | 050505 | 041040 | REQ    | ASCIZ | /REQ BY OPR/                   |
| 3107 | 003312 | 054105 | 023510 | 020104 | SEXHAL | ASCIZ | /EXH'D RETRY ON SEEK/          |
| 3108 | 003336 | 042110 | 020123 | 047516 | UNLOAD | ASCIZ | /HDS NOT UNLD ON ERR/          |
| 3109 | 003362 | 051104 | 053440 | 042114 | NOLOAD | ASCIZ | /DR WLD NOT LD/                |
| 3110 | 003400 | 050117 | 051105 | 046040 | SOPLMT | ASCIZ | /OPER LMTS EXC'D/              |
| 3111 | 003420 | 040507 | 041122 | 046102 | NOREV  | ASCIZ | /GARBLED DATA - CAN'T CHECK IT |
| 3112 | 003457 | 115    | 051117 | 020105 | MBDMSC | ASCIZ | /MORE THAN 16 BAD SECTORS      |
| 3113 | 003510 | 047516 | 043040 | 041501 | HWSEC  | ASCIZ | /NO FACTOPY FILE               |
| 3114 | 003530 | 047516 | 043040 | 042511 | SWSEC  | ASCIZ | /NO FIELD FILE                 |
| 3115 | 003546 | 026520 | 040524 | 046102 | MPT    | ASCIZ | /P-TABLE                       |
| 3116 | 003560 | 046111 | 020114 | 026520 | ILLEG  | ASCIZ | /ILL P-TABLE                   |
| 3117 | 003574 | 053040 | 041505 | 047524 | MVEC   | ASCIZ | / VECTOR                       |
| 3118 | 003606 | 047516 | 042040 | 044522 | NODRIV | ASCIZ | /NO DRIVES/                    |
| 3119 | 003620 | 042040 | 044522 | 042526 | DRNM   | ASCIZ | / DRIVE                        |
| 3120 | 003631 | 040    | 051514 | 020124 | LPS    | ASCIZ | / LST POS                      |
| 3121 | 003644 | 042440 | 050130 | 050040 | EPS    | ASCIZ | / EXP POS                      |
| 3122 | 003657 | 040    | 042522 | 020103 | RPS    | ASCIZ | / PEC POS                      |
| 3123 | 003672 | 051104 | 042040 | 042111 | NOFWR  | ASCIZ | /DR DID REC'D FR IM PWR        |
| 3124 | 003723 | 101    | 020124 | 052502 | BUSAD  | ASCIZ | /AT BUS ADDP                   |
| 3125 | 003741 | 122    | 052105 | 054522 | MRT    | ASCIZ | /RETRY'S                       |
| 3126 | 003752 | 042440 | 051122 | 051117 | ERT    | ASCIZ | / ERROR TYPE                   |
| 3127 | 003770 | 052123 | 052101 | 051525 | MST    | ASCIZ | /STATUS WAS                    |
| 3128 | 004005 | 040    | 044123 | 052517 | MST1   | ASCIZ | / SHOULD BE                    |
| 3129 | 004022 | 051040 | 052105 | 044522 | RT1    | ASCIZ | / RETRIES ATTEMPTED            |
| 3130 | 004045 | 040    | 054105 | 023520 | EXP    | ASCIZ | / EXP'D                        |
| 3131 | 004056 | 051040 | 041505 | 042047 | RCD    | ASCIZ | / REC'D                        |
| 3132 | 004067 | 104    | 044522 | 042526 | DROP   | ASCIZ | /DRIVE DROPPED                 |
| 3133 | 004105 | 040    | 047110 | 000106 | MTHNF  | ASCIZ | / HNF                          |
| 3134 | 004112 | 044040 | 051103 | 000103 | MTHCRC | ASCIZ | / HCRC                         |
| 3135 | 004120 | 042040 | 045503 | 000    | MTDCRC | ASCIZ | / DCRC                         |
| 3136 | 004125 | 040    | 046104 | 000124 | MTOLT  | ASCIZ | / DLT                          |
| 3137 | 004132 | 047440 | 044520 | 000    | MTOP1  | ASCIZ | / OP1                          |
| 3138 | 004137 | 040    | 054116 | 000115 | MTNXM  | ASCIZ | / NXM                          |
| 3139 | 004144 | 042040 | 053122 | 000    | MTDRV  | ASCIZ | / DRV                          |
| 3140 | 004151 | 124    | 051505 | 044524 | MSTAPT | ASCIZ | /TESTING STARTED/              |
| 3141 | 004171 | 127    | 044522 | 044524 | MSWRPK | ASCIZ | /WRITING PACK                  |

3142  
3143  
3144  
3145  
3146

THIS LIST OF ASCII TEXT IS USED AS A TABLE FOR PRINTING  
 FUNCTIONS IN ERROR MESSAGES. TABLE IS "MTCR - MTRC"  
 THE ORDER IS IMPORTANT AS WELL AS THE LENGTH OF EACH  
 ASCII STRING. EACH STRING IS SEVEN(10) BYTES PLUS ZERO.

```

3147          .FILL BYTE (TOTAL 8(EIGHT) BYTES) LONG   USED IN LINE1
3148          .SUBROUTINE
3149          .
3150          .
3151 004210 053440 041522 045510 MTCR   .ASCIZ / WRCHK /
3152 004220 043440 051524 040524 MTGS   .ASCIZ / GTSTAT/
3153 004230 051440 042505 020113 MTSK   .ASCIZ / SEEK /
3154 004240 051040 044104 051104 MTRH   .ASCIZ / RDHDR /
3155 004250 053440 044522 042524 MTWR   .ASCIZ / WRITE /
3156 004260 051040 040505 020104 MTRD   .ASCIZ / READ /
3157
3158
3159          .END OF LIST NOW YOU CAN PUT ANY THING YOU WANT HERE
3160
3161
3162
3163
3164
3165
3166
3167
3168          EVEN
3169
3170 004270          ENDMOD
3171
3172          SBTTL  ERROR MESSAGES
3173
3174 004270          BGNMOD  GLBERR
3175
3176
3177          .GENERAL ERROR REPORT
3178 004270          BGNMSG  ERR1
3179 004270 004737 005460          JSR      PC,LINE3
3180 004274          ENDMMSG
3181 (3) 004274          L10000
3182 (3) 004274 104023          EMT      C$MSG
3183
3184          .MIS-SEEK ERROR REPORT
3185
3186 004276          BGNMSG  ERR2
3187 004276 004737 005460          JSR      PC,LINE3
3188 004302          PRINTB  #FMT4,#DIFMSG,DIFWD(R4),#LPS,LSTHDR,R4),#EPS,PRPOS(R4),#PPS,R1
3189 (15) 004302 010146          MOV      R1,-(SP)
3190 (14) 004304 012746 003657          MOV      #RPS,-(SP)
3191 (13) 004310 016446 000120          MOV      PRPOS(R4),-(SP)
3192 (12) 004314 012746 003644          MOV      #EPS,-(SP)
3193 (11) 004320 016446 000050          MOV      LSTHDR(R4),-(SP)
3194 (10) 004324 012746 003631          MOV      #LPS,-(SP)
3195 (9) 004330 016446 000066          MOV      DIFWD(R4),-(SP)
3196 (8) 004334 012746 002417          MOV      #DIFMSG,-(SP)
3197 (7) 004340 012746 005777          MOV      #FMT4,-(SP)
3198 (6) 004344 012746 000011          MOV      #11,-(SP)
3199 (3) 004350 010600          MOV      SP,R0
3200 (4) 004352 104014          EMT      C$PNTB
3201 (4) 004354 062706 000024          ADD      #24,SP
3202 3187 004360          ENDMMSG
3203 (3) 004360          L10001
3204 (3) 004360 104023          EMT      C$MSG
3205 3188

```

.SOFT. ERROR RECOVERABLE ERROR REPORT

|      |        |        |        |        |        |   |
|------|--------|--------|--------|--------|--------|---|
| 3189 |        |        |        | BGNMSG | ERR3   |   |
| 3190 | 004362 |        |        |        | JSR    | PC, LINE1   |
| 3191 | 004362 | 004737 | 005214 |        | PRINTB | #FMT2A, #CRLCS, SOFTCS(R4), #CRLBA, @BBB(R4), #CRLDA, LSTDA(R4) |
| 3192 | 004366 |        |        |        | MOV    | LSTDA(R4), -(SP)  |
| (13) | 004366 | 016446 | 000064 |        | MOV    | #CRLDA, -(SP)   |
| (12) | 004372 | 012746 | 002373 |        | MOV    | @BBB(R4), -(SP)   |
| (11) | 004376 | 017446 | 000110 |        | MOV    | #CRLBA, -(SP)   |
| (10) | 004402 | 012746 | 002361 |        | MOV    | SOFTCS(R4), -(SP)   |
| (9)  | 004406 | 016446 | 000116 |        | MOV    | #CRLCS, -(SP)   |
| (8)  | 004412 | 012746 | 002333 |        | MOV    | #FMT2A, -(SP)   |
| (7)  | 004416 | 012746 | 005712 |        | MOV    | #7, -(SP)   |
| (6)  | 004422 | 012746 | 000007 |        | MOV    | SP, R0  |
| (5)  | 004426 | 010600 |        |        | EMT    | C\$PNTB   |
| (4)  | 004430 | 104014 |        |        | ADD    | #20, SP   |
| (4)  | 004432 | 062706 | 000020 |        | PRINTB | #FMT5, #MRT, RETRY(R4), #ERT, RTYPE(R4)                         |
| 3192 | 004436 |        |        |        | MOV    | RTYPE(R4), -(SP)  |
| (11) | 004436 | 016446 | 000052 |        | MOV    | #ERT, -(SP)   |
| (10) | 004442 | 012746 | 003752 |        | MOV    | RETRY(R4), -(SP)  |
| (9)  | 004446 | 016446 | 000036 |        | MOV    | #MRT, -(SP)   |
| (8)  | 004452 | 012746 | 003741 |        | MOV    | #FMT5, -(SP)  |
| (7)  | 004456 | 012746 | 006030 |        | MOV    | #5, -(SP)   |
| (6)  | 004462 | 012746 | 000005 |        | MOV    | SP, R0  |
| (3)  | 004466 | 010600 |        |        | EMT    | C\$PNTB   |
| (4)  | 004470 | 104014 |        |        | ADD    | #14, SP   |
| (4)  | 004472 | 062706 | 000014 |        | ENDMSG |   |
| 3194 | 004476 |        |        |        |        |   |
| (3)  | 004476 |        |        | L10002 | EMT    | C\$MSG  |
| (3)  | 004476 | 104023 |        |        |        |   |

.GET STATUS ERROR REPORT

|      |        |        |        |        |        |                                 |
|------|--------|--------|--------|--------|--------|---------------------------------|
| 3195 |        |        |        | BGNMSG | ERR4   |                                 |
| 3196 |        |        |        |        | JSR    | PC, LINE3                       |
| 3197 |        |        |        |        | PRINTB | #FMT6, #MST E MP, #MST1 ST1 ST2 |
| 3198 | 004500 |        |        |        | MOV    | ST2, -(SP)                      |
| 3199 | 004500 | 004737 | 005460 |        | MOV    | ST1, -(SP)                      |
| 3200 | 004504 |        |        |        | MOV    | #MST1, -(SP)                    |
| (12) | 004504 | 013746 | 002306 |        | MOV    | E MP, -(SP)                     |
| (11) | 004510 | 013746 | 002304 |        | MOV    | #MST, -(SP)                     |
| (10) | 004514 | 012746 | 004005 |        | MOV    | #FMT6, -(SP)                    |
| (9)  | 004520 | 013746 | 002242 |        | MOV    | #6, -(SP)                       |
| (8)  | 004524 | 012746 | 003770 |        | MOV    | SP, R0                          |
| (7)  | 004530 | 012746 | 006044 |        | EMT    | C\$PNTB                         |
| (6)  | 004534 | 012746 | 000006 |        | ADD    | #16, SP                         |
| (3)  | 004540 | 010600 |        |        | ENDMSG |                                 |
| (4)  | 004542 | 104014 |        |        |        |                                 |
| (4)  | 004544 | 062706 | 000016 |        |        |                                 |
| 3201 | 004550 |        |        |        |        |                                 |
| (3)  | 004550 |        |        | L10002 | EMT    | C\$MSG                          |
| (3)  | 004550 | 104023 |        |        |        |                                 |

.DATA ERROR SUMMARY

|      |        |        |        |        |        |                   |
|------|--------|--------|--------|--------|--------|-------------------|
| 3202 |        |        |        | BGNMSG | ERR6   |                   |
| 3203 |        |        |        |        | JSR    | PC, LINE2         |
| 3204 |        |        |        |        | MOV    | BMP(R4), R0       |
| 3205 |        |        |        |        | PRINTB | #FMT9A, DECNT, R0 |
| 3206 | 004552 |        |        |        | MOV    | RC, -(SP)         |
| 3207 | 004552 | 004737 | 005374 |        |        |                   |
| 3208 | 004556 | 016400 | 000042 |        |        |                   |
| 3209 | 004562 |        |        |        |        |                   |
| (9)  | 004562 | 010046 |        |        |        |                   |

|      |        |        |        |        |               |
|------|--------|--------|--------|--------|---------------|
| (2)  | 004564 | 013746 | 002160 | MOV    | DECNT, -(SP)  |
| (7)  | 004570 | 012746 | 006214 | MOV    | #FMT9A, -(SP) |
| (6)  | 004574 | 012746 | 000003 | MOV    | #3, -(SP)     |
| (3)  | 004600 | 010600 |        | MOV    | SP, R0        |
| (4)  | 004602 | 104014 |        | EMT    | C\$PNTB       |
| (4)  | 004604 | 062706 | 000010 | ADD    | #10, SP       |
| 3210 | 004610 |        |        | ENDMSG |               |
| (3)  | 004610 |        |        |        |               |
| (3)  | 004610 | 104023 |        | EMT    | C\$MSG        |

L10004

.NON RECOVERABLE ERROR REPORT

|      |        |        |        |        |                        |
|------|--------|--------|--------|--------|------------------------|
| 3211 |        |        |        |        |                        |
| 3212 |        |        |        |        |                        |
| 3213 |        |        |        |        |                        |
| 3214 | 004612 |        |        | BGNMSG | ERR7                   |
| 3215 | 004612 |        |        | PRINTB | #FMT8, RETRY(R4), #RT1 |
| (9)  | 004612 | 012746 | 004022 | MOV    | #RT1, -(SP)            |
| (8)  | 004616 | 016446 | 000036 | MOV    | RETRY(R4), -(SP)       |
| (7)  | 004622 | 012746 | 006146 | MOV    | #FMT8, -(SP)           |
| (6)  | 004626 | 012746 | 000003 | MOV    | #3, -(SP)              |
| (3)  | 004632 | 010600 |        | MOV    | SP, R0                 |
| (4)  | 004634 | 104014 |        | EMT    | C\$PNTB                |
| (4)  | 004636 | 062706 | 000010 | ADD    | #10, SP                |
| 3216 | 004642 | 004737 | 005460 | JSR    | PC, LINE3              |
| 3217 | 004646 |        |        | ENDMSG |                        |
| (3)  | 004646 |        |        |        |                        |
| (3)  | 004646 | 104023 |        | EMT    | C\$MSG                 |

L10005

.BAD DATA COMPARE ERROR REPORT

|      |        |        |        |        |  |
|------|--------|--------|--------|--------|--|
| 3218 |        |        |        |        |  |
| 3219 |        |        |        |        |  |
| 3220 |        |        |        |        |  |
| 3221 | 004650 |        |        | BGNMSG | ERR8   |
| 3222 | 004650 |        |        | PRINTB | #FMT10, #TIME HOUR MINUTE SECOND, #MRLCS, DCS(P4), #DRNM, <B, DRSEL+1(R4)> |
| (15) | 004650 | 005046 |        | CLR    | -(SP)  |
| (15) | 004652 | 156416 | 000107 | BISB   | DRSEL+1(R4), (SP)  |
| (14) | 004656 | 012746 | 003620 | MOV    | #DRNM, -(SP)   |
| (13) | 004662 | 016446 | 000104 | MOV    | DCS(R4), -(SP)   |
| (12) | 004666 | 012746 | 002323 | MOV    | #MRLCS, -(SP)  |
| (11) | 004672 | 013746 | 002226 | MOV    | SECOND, -(SP)  |
| (10) | 004676 | 013746 | 002230 | MOV    | MINUTE, -(SP)  |
| (9)  | 004702 | 013746 | 002232 | MOV    | HOUR, -(SP)  |
| (8)  | 004706 | 012746 | 002314 | MOV    | #TIME, -(SP)   |
| (7)  | 004712 | 012746 | 006266 | MOV    | #FMT10, -(SP)  |
| (6)  | 004716 | 012746 | 000011 | MOV    | #11, -(SP)   |
| (3)  | 004722 | 010600 |        | MOV    | SP, R0   |
| (4)  | 004724 | 104014 |        | EMT    | C\$PNTB  |
| (4)  | 004726 | 062706 | 000024 | ADD    | #24, SP  |
| 3223 | 004732 |        |        | PRINTB | #FMT10A, #CRLBA, #BBA(P4), #CPLDA BDA(P4), #EXP, GODAT, #RCD, (R2)         |
| (15) | 004732 | 011246 |        | MOV    | (R2), -(SP)  |
| (14) | 004734 | 012746 | 004056 | MOV    | #RCD, -(SP)  |
| (13) | 004740 | 013746 | 002216 | MOV    | GODAT, -(SP)   |
| (12) | 004744 | 012746 | 004045 | MOV    | #EXP, -(SP)  |
| (11) | 004750 | 016446 | 000040 | MOV    | BDA(R4), -(SP)   |
| (10) | 004754 | 012746 | 002373 | MOV    | #CRLDA, -(SP)  |
| (9)  | 004760 | 017446 | 000110 | MOV    | #BBA(R4), -(SP)  |
| (8)  | 004764 | 012746 | 002361 | MOV    | #CRLBA, -(SP)  |
| (7)  | 004770 | 012746 | 006322 | MOV    | #FMT10A, -(SP)   |
| (6)  | 004774 | 012746 | 000011 | MOV    | #11, -(SP)   |
| (3)  | 005000 | 010600 |        | MOV    | SP, R0   |

|      |        |        |        |        |   |                                   |
|------|--------|--------|--------|--------|---|-----------------------------------|
| (4)  | 005002 | 104014 |        | EMT    | CSPNTB                                      |                                   |
| (4)  | 005004 | 062706 | 000024 | ADD    | #24, SP                                     |                                   |
| 3224 | 005010 |        |        | PRINTB | #FMT10B, R2                                 |                                   |
| (8)  | 005010 | 010246 |        | MOV    | R2, -(SP)                                   |                                   |
| (7)  | 005012 | 012746 | 006373 | MOV    | #FMT10B, -(SP)                              |                                   |
| (6)  | 005016 | 012746 | 000002 | MOV    | #2, -(SP)                                   |                                   |
| (3)  | 005022 | 010600 |        | MOV    | SP, R0                                      |                                   |
| (4)  | 005024 | 104014 |        | EMT    | CSPNTB                                      |                                   |
| (4)  | 005026 | 062706 | 000006 | ADD    | #6, SP                                      |                                   |
| 3225 | 005032 |        |        | ENDMSG |   |                                   |
| (3)  | 005032 |        |        | L10006 |   |                                   |
| (3)  | 005032 | 104023 |        | EMT    | C\$MSG                                      | . DRIVE ERROR                     |
| 3226 |        |        |        |        |   |                                   |
| 3227 |        |        |        |        |   |                                   |
| 3228 | 005034 |        |        | BGNMSG | ERR9  |                                   |
| 3229 |        |        |        |        |   |                                   |
| 3230 | 005034 | 004737 | 005460 | JSR    | PC, LINE3                                   |                                   |
| 3231 | 005040 |        |        | PRINTB | #FMT13, #MST, R1, #LPS, LSTHDR(R4)          |                                   |
| (11) | 005040 | 016446 | 000050 | MOV    | LSTHDR(R4), -(SP)                           |                                   |
| (10) | 005044 | 012746 | 003631 | MOV    | #LPS, -(SP)                                 |                                   |
| (9)  | 005050 | 010146 |        | MOV    | R1, -(SP)                                   |                                   |
| (8)  | 005052 | 012746 | 003770 | MOV    | #MST, -(SP)                                 |                                   |
| (7)  | 005056 | 012746 | 006431 | MOV    | #FMT13, -(SP)                               |                                   |
| (6)  | 005062 | 012746 | 000005 | MOV    | #5, -(SP)                                   |                                   |
| (3)  | 005066 | 010600 |        | MOV    | SP, P0                                      |                                   |
| (4)  | 005070 | 104014 |        | EMT    | CSPNTB                                      |                                   |
| (4)  | 005072 | 062706 | 000014 | ADD    | #14, SP                                     |                                   |
| 3232 | 005076 |        |        | ENDMSG |   |                                   |
| (3)  | 005076 |        |        | L10007 |   |                                   |
| (3)  | 005076 | 104023 |        | EMT    | C\$MSG                                      |                                   |
| 3233 |        |        |        |        |   |                                   |
| 3234 |        |        |        |        |   |                                   |
| 3235 |        |        |        |        |   | . INVALID ENTRY IN P-TABLE REPORT |
| 3236 |        |        |        |        |   |                                   |
| 3237 | 005100 |        |        | BGNMSG | ERR10                                       |                                   |
| 3238 | 005100 |        |        | PRINTB | #FMT11, #MPT, R1, #MRLCS, BCSP, #MVEC, BVEC |                                   |
| (13) | 005100 | 013746 | 002146 | MOV    | BVEC, -(SP)                                 |                                   |
| (12) | 005104 | 012746 | 003574 | MOV    | #MVEC, -(SP)                                |                                   |
| (11) | 005110 | 013746 | 002144 | MOV    | BCSR, -(SP)                                 |                                   |
| (10) | 005114 | 012746 | 002323 | MOV    | #MRLCS, -(SP)                               |                                   |
| (9)  | 005120 | 010146 |        | MOV    | R1, -(SP)                                   |                                   |
| (8)  | 005122 | 012746 | 003546 | MOV    | #MPT, -(SP)                                 |                                   |
| (7)  | 005126 | 012746 | 006401 | MOV    | #FMT11, -(SP)                               |                                   |
| (6)  | 005132 | 012746 | 000007 | MOV    | #7, -(SP)                                   |                                   |
| (3)  | 005136 | 010600 |        | MOV    | SP, R0                                      |                                   |
| (4)  | 005140 | 104014 |        | EMT    | CSPNTB                                      |                                   |
| (4)  | 005142 | 062706 | 000020 | ADD    | #20, SP                                     |                                   |
| 3239 | 005146 |        |        | ENDMSG |   |                                   |
| (3)  | 005146 |        |        | L10010 |   |                                   |
| (3)  | 005146 | 104023 |        | EMT    | C\$MSG                                      |                                   |
| 3240 |        |        |        |        |   |                                   |
| 3241 |        |        |        |        |   |                                   |
| 3242 | 005150 |        |        | BGNMSG | ERR12                                       |                                   |
| 3243 |        |        |        |        |   |                                   |
| 3244 | 005150 | 004737 | 005461 | JSP    | PC, LINE3                                   |                                   |
| 3245 |        |        |        |        |   |                                   |

|      |        |        |        |        |        |        |  |
|------|--------|--------|--------|--------|--------|--------|--|
| 3246 | 005154 |        |        |        |        | ENDMSG |  |
| (3)  | 005154 |        |        |        | L10011 |        |  |
| (3)  | 005154 | 104023 |        |        |        | EMT    | C\$MSG   |
| 3247 |        |        |        |        |        |        |  |
| 3248 | 005156 |        |        |        | BGNMSG | ERR13  |  |
| 3249 |        |        |        |        |        |        |  |
| 3250 | 005156 | 004737 | 005460 |        |        | JSR    | PC, LINE3  |
| 3251 | 005162 |        |        |        |        | PRINTB | #FMT12, #MSG, BDA(R4)  |
| (9)  | 005162 | 016446 | 000040 |        |        | MOV    | BDA(R4), -(SP)   |
| (8)  | 005166 | 012746 | 002550 |        |        | MOV    | #MSG, -(SP)  |
| (7)  | 005172 | 012746 | 006421 |        |        | MOV    | #FMT12, -(SP)  |
| (6)  | 005176 | 012746 | 000003 |        |        | MOV    | #3, -(SP)  |
| (3)  | 005202 | 010600 |        |        |        | MOV    | SP, RO   |
| (4)  | 005204 | 104014 |        |        |        | EMT    | C\$PNTB  |
| (4)  | 005206 | 062706 | 000010 |        |        | ADD    | #10, SP  |
| 3252 |        |        |        |        |        |        |  |
| 3253 | 005212 |        |        |        |        | ENDMSG |  |
| (3)  | 005212 |        |        |        | L10012 |        |  |
| (3)  | 005212 | 104023 |        |        |        | EMT    | C\$MSG   |
| 3254 |        |        |        |        |        |        |  |
| 3255 | 005214 | 016437 | 000044 | 002274 | LINE1  | MOV    | FUNC(R4), FASPNT   |
| 3256 | 005222 | 012737 | 004210 | 002272 |        | MOV    | #MTCR, FASCII  |
| 3257 | 005230 | 042737 | 000100 | 002274 |        | BIC    | #INTEN, FASPNT   |
| 3258 | 005236 | 006237 | 002274 |        |        | ASR    | FASPNT   |
| 3259 | 005242 | 005337 | 002274 |        | 15     | DEC    | FASPNT   |
| 3260 | 005246 | 001404 |        |        |        | BEQ    | 25   |
| 3261 | 005250 | 062737 | 000010 | 002272 |        | ADC    | #8, FASCII   |
| 3262 | 005256 | 000771 |        |        |        | BF     | 15   |
| 3263 |        |        |        |        |        |        |  |
| 3264 | 005260 |        |        |        | 25     |        |  |
| 3265 |        |        |        |        |        |        |  |
| 3266 | 005260 |        |        |        |        | PRINTB | #FMT1, #TIME, HOUR, MINUTE, SECOND, #MPLCS, DCS(R4), #DRNM, <B, DRSEL+1(R4)> |
| (15) | 005260 | 005046 |        |        |        | CLR    | -(SP)  |
| (15) | 005262 | 156416 | 000107 |        |        | BISB   | DRSEL+1(R4), (SP)  |
| (14) | 005266 | 012746 | 003620 |        |        | MOV    | #DRNM, -(SP)   |
| (13) | 005272 | 016446 | 000104 |        |        | MOV    | DCS(R4), -(SP)   |
| (12) | 005276 | 012746 | 002323 |        |        | MOV    | #MRLCS, -(SP)  |
| (11) | 005302 | 013746 | 002226 |        |        | MOV    | SECOND, -(SP)  |
| (10) | 005306 | 013746 | 002230 |        |        | MOV    | MINUTE, -(SP)  |
| (9)  | 005312 | 013746 | 002232 |        |        | MOV    | HOUR, -(SP)  |
| (8)  | 005316 | 012746 | 002314 |        |        | MOV    | #TIME, -(SP)   |
| (7)  | 005322 | 012746 | 005626 |        |        | MOV    | #FMT1, -(SP)   |
| (6)  | 005326 | 012746 | 000011 |        |        | MOV    | #11, -(SP)   |
| (3)  | 005332 | 010600 |        |        |        | MOV    | SP, RO   |
| (4)  | 005334 | 104014 |        |        |        | EMT    | C\$PNTB  |
| (4)  | 005336 | 062706 | 000024 |        |        | ADD    | #24, SP  |
| 3267 | 005342 |        |        |        |        | PRINTB | #FMT1A, #MFUNC, FASCII   |
| (9)  | 005342 | 013746 | 002272 |        |        | MOV    | FASCII, -(SP)  |
| (8)  | 005346 | 012746 | 002345 |        |        | MOV    | #MFUNC, -(SP)  |
| (7)  | 005352 | 012746 | 005662 |        |        | MOV    | #FMT1A, -(SP)  |
| (6)  | 005356 | 012746 | 000003 |        |        | MOV    | #3, -(SP)  |
| (3)  | 005362 | 010600 |        |        |        | MOV    | SP, RO   |
| (4)  | 005364 | 104014 |        |        |        | EMT    | C\$PNTB  |
| (4)  | 005366 | 062706 | 000010 |        |        | ADD    | #10, SP  |
| 3268 | 005372 | 000207 |        |        |        | RTS    | PC   |
| 3269 |        |        |        |        |        |        |  |

|      |        |        |        |       |        |  |
|------|--------|--------|--------|-------|--------|--|
| 3270 | 005374 |        |        | LINE2 | PRINTB | #FMT9, #TIME, HOUR, MINUTE, SECOND, #MRLCS, DCS(R4), #DRNM, <B, DRSEL+1(R4)> |
| (15) | 005374 | 005046 |        |       | CLR    | -(SP)  |
| (15) | 005376 | 156416 | 000107 |       | BISB   | DRSEL+1(R4), (SP)  |
| (14) | 005402 | 012746 | 003620 |       | MOV    | #DRNM, -(SP)   |
| (13) | 005406 | 016446 | 000104 |       | MOV    | DCS(R4), -(SP)   |
| (12) | 005412 | 012746 | 002323 |       | MOV    | #MRLCS, -(SP)  |
| (11) | 005416 | 013746 | 002226 |       | MOV    | SECOND, -(SP)  |
| (10) | 005422 | 013746 | 002230 |       | MOV    | MINUTE, -(SP)  |
| (9)  | 005426 | 013746 | 002232 |       | MOV    | HOUR, -(SP)  |
| (8)  | 005432 | 012746 | 002314 |       | MOV    | #TIME, -(SP)   |
| (7)  | 005436 | 012746 | 006156 |       | MOV    | #FMT9, -(SP)   |
| (6)  | 005442 | 012746 | 000011 |       | MOV    | #11, -(SP)   |
| (5)  | 005446 | 010600 |        |       | MOV    | SP, RO   |
| (4)  | 005450 | 104014 |        |       | EMT    | CSPNTB   |
| (4)  | 005452 | 062706 | 000024 |       | ADD    | #24, SP  |
| (3)  | 005456 | 000207 |        |       | RTS    | PC   |

|      |        |        |        |       |        |   |
|------|--------|--------|--------|-------|--------|---|
| 3273 | 005460 | 004737 | 005214 | LINE3 | JSR    | PC, LINE1   |
| 3274 | 005464 |        |        |       | PRINTB | #FMT2, #CRLCS, BCSADR(R4), #CRLBA, @BBA(R4), #CPLDA, BDA(R4), #CRLMP, BMP(R4) |
| (15) | 005464 | 016446 | 000042 |       | MOV    | BMP(R4), -(SP)  |
| (14) | 005470 | 012746 | 002405 |       | MOV    | #CRLMP, -(SP)   |
| (13) | 005474 | 016446 | 000040 |       | MOV    | BDA(R4), -(SP)  |
| (12) | 005500 | 012746 | 002373 |       | MOV    | #CRLDA, -(SP)   |
| (11) | 005504 | 017446 | 000110 |       | MOV    | @BBA(R4), -(SP)   |
| (10) | 005510 | 012746 | 002361 |       | MOV    | #CRLBA, -(SP)   |
| (9)  | 005514 | 016446 | 000046 |       | MOV    | BCSADR(R4), -(SP)   |
| (8)  | 005520 | 012746 | 002333 |       | MOV    | #CRLCS, -(SP)   |
| (7)  | 005524 | 012746 | 005671 |       | MOV    | #FMT2, -(SP)  |
| (6)  | 005530 | 012746 | 000011 |       | MOV    | #11, -(SP)  |
| (3)  | 005534 | 010600 |        |       | MOV    | SP, RO  |
| (4)  | 005536 | 104014 |        |       | EMT    | CSPNTB  |
| (4)  | 005540 | 062706 | 000024 |       | ADD    | #24, SP   |

|      |        |        |        |  |        |   |
|------|--------|--------|--------|--|--------|---|
| 3275 | 005544 |        |        |  | PRINTB | #FMT3, #CRLCS, E CS #CFLBA E BA #CPLDA E CA, #CRLMP, E MP |
| (15) | 005544 | 013746 | 002242 |  | MOV    | E MP, -(SP)   |
| (14) | 005550 | 012746 | 002405 |  | MOV    | #CRLMP, -(SP)   |
| (13) | 005554 | 013746 | 002240 |  | MOV    | E DA, -(SP)   |
| (12) | 005560 | 012746 | 002373 |  | MOV    | #CRLDA, -(SP)   |
| (11) | 005564 | 013746 | 002236 |  | MOV    | E BA, -(SP)   |
| (10) | 005570 | 012746 | 002361 |  | MOV    | #CPLBA, -(SP)   |
| (9)  | 005574 | 013746 | 002234 |  | MOV    | E CS, -(SP)   |
| (8)  | 005600 | 012746 | 002333 |  | MOV    | #CRLCS, -(SP)   |
| (7)  | 005604 | 012746 | 005734 |  | MOV    | #FMT3, -(SP)  |
| (6)  | 005610 | 012746 | 000011 |  | MOV    | #11, -(SP)  |
| (3)  | 005614 | 010600 |        |  | MOV    | SP, RO  |
| (4)  | 005616 | 104014 |        |  | EMT    | CSPNTB  |
| (4)  | 005620 | 062706 | 000024 |  | ADD    | #24, SP   |
| 3276 | 005624 | 000207 |        |  | RTS    | PC  |

FORMAT STATEMENTS

|      |        |        |        |        |       |        |                     |
|------|--------|--------|--------|--------|-------|--------|---------------------|
| 3284 | 005626 | 052045 | 055045 | 022462 | FMT1  | ASCII  | /%T%Z2%A: %Z2%A %Z2 |
| 3285 | 005647 | 045    | 022524 | 033117 | FMT17 | ASCII2 | /%T%06%T%01/        |
| 3286 | 005662 | 052045 | 052045 | 047045 | FMT1A | ASCII2 | /%T%T%N/            |
| 3287 | 005671 | 045    | 041101 | 043105 | FMT2  | ASCII  | /%ABEFORE ERR%T%06  |
| 3288 | 005712 | 052045 | 047445 | 022466 | FMT2A | ASCII2 | /%T%06%T%06%T%06%N  |

|      |        |        |        |        |         |               |  |
|------|--------|--------|--------|--------|---------|---------------|--|
| 3289 | 005734 | 040445 | 052101 | 042440 | FMT3:   | ASCIZ         | /%AAT ERR %T%06%T%06%T%06%T%06%N/                              |
| 3290 | 005777 | 045    | 022524 | 033117 | FMT4    | ASCIZ         | /%T%06%T%06%N%T%06%T%06%N/                                     |
| 3291 | 006030 | 052045 | 047445 | 022466 | FMT5:   | ASCIZ         | /%T%06%T%T%N/  |
| 3292 | 006044 | 052045 | 047445 | 022466 | FMT6:   | ASCIZ         | /%T%06%T%06%A OR %06%N/  |
| 3293 | 006072 | 047045 | 052045 | 055045 | FMT7    | ASCIZ         | /%N%T%Z2%A: %Z2%A %Z2%T%06%T/                                  |
| 3294 | 006125 | 045    | 030517 | 047045 | FMT7A:  | ASCIZ         | /%01%N%T%A - %T%N/   |
| 3295 | 006146 | 042045 | 022466 | 022524 | FMT8:   | ASCIZ         | /%D6%T%N/  |
| 3296 | 006156 | 052045 | 055045 | 022462 | FMT9:   | ASCIZ         | /%T%Z2%A: %Z2%A: %Z2%T%06%T%01%N/                              |
| 3297 | 006214 | 042045 | 022466 | 020101 | FMT9A:  | ASCIZ         | /%D6%A WORDS BAD OUT OF %D6%A WORDS READ%N/                    |
| 3298 | 006266 | 052045 | 055045 | 022462 | FMT10   | ASCIZ         | /%T%Z2%A: %Z2%A %Z2%T%06%T%01/                                 |
| 3299 | 006322 | 052045 | 047445 | 022466 | FMT10A  | ASCIZ         | /%T%06%T%06%N%T%06%T%06%A AT BUS ADDRESS /                     |
| 3300 | 006373 | 045    | 033117 | 047045 | FMT10B  | ASCIZ         | /%06%N/  |
| 3301 | 006401 | 045    | 022524 | 031117 | FMT11:  | ASCIZ         | /%T%02%T%06%T%03/  |
| 3302 | 006421 | 045    | 022524 | 033117 | FMT12   | ASCIZ         | /%T%06%N/  |
| 3303 | 006431 | 045    | 022524 | 033117 | FMT13   | ASCIZ         | /%T%06%T%06%N/   |
| 3304 | 006446 | 052045 | 055045 | 022464 | FMT13D  | ASCIZ         | /%T%Z4%A NOW IS %Z4%T/   |
| 3305 | 006473 | 045    | 022516 | 022524 | FMT14   | ASCIZ         | /%N%T%N/   |
| 3306 | 006502 | 047445 | 022466 | 020101 | FMT14A  | ASCIZ         | /%06%A /   |
| 3307 | 006511 | 045    | 000116 |        | FMT14C  | ASCIZ         | /%N/   |
| 3308 | 006514 | 040445 | 047527 | 042122 | FMT14B  | ASCIZ         | ?%AWORD %D3%A S/B %06%A WAS %06%N?                             |
| 3309 | 006556 | 040445 | 051105 | 047522 | FMT15   | ASCIZ         | /%AERROR(S) SET %T%N%ARECOVERY BEING ATTEMPTED/                |
| 3310 | 006634 | 040445 | 047516 | 020124 | FRMT16  | ASCIZ         | /%ANOT TESTING CS= %06%A DR= %01%N/                            |
| 3311 | 006676 | 047045 | 052045 | 000    | FMT18   | ASCIZ         | /%N%T/   |
| 3312 | 006703 | 045    | 022516 | 022516 | FMTS1   | ASCIZ         | /%N%N%S10%A*** RLO1 PERFORMANCE REPORT ***%N%N/                |
| 3313 | 006761 | 045    | 020101 | 051040 | FMTS1A  | ASCIZ         | /%A RUNNING%N/   |
| 3314 | 006777 | 045    | 020101 | 042040 | FMTS1B  | ASCIZ         | /%A DROPPED %Z2%A %Z2%N/                                       |
| 3315 | 007030 | 052045 | 047445 | 022465 | FMTS2   | ASCIZ         | /%T%05%05%N/   |
| 3316 | 007043 | 045    | 051501 | 042505 | FMTS2A  | ASCIZ         | /%ASEEKS %D6%Z3%N%ABITS READ %D6%Z4%Z4%A (*16)%N/              |
| 3317 | 007130 | 040445 | 044502 | 051524 | FMTS2B  | ASCIZ         | /%ABITS WRITTEN %D6%Z4%Z4%A (*16)%N/                           |
| 3318 | 007174 | 047045 | 040445 | 051105 | FMTS3:  | ASCIZ         | /%N%AEERRORS%N%ADRIVE %D6%A SEEK %D6%A TRACK %D6%A DATA %D6%N/ |
| 3319 | 007275 | 045    | 044101 | 051101 | FMTS3A: | ASCIZ         | /%AHARD %D6%A SOFT %D6%N/                                      |
| 3320 | 007330 | 040445 | 041504 | 035113 | FMTS4   | ASCIZ         | /%ADCK %D6%A HCRC %D6%A NAM %D6%A HNF. %D6%N/                  |
| 3321 | 007414 | 040445 | 046104 | 035124 | FMTS5   | ASCIZ         | /%ADLT %D6%A OPI %D6%N%N/                                      |
| 3322 |        |        |        |        |         |               |  |
| 3326 |        |        |        |        |         |               |  |
| 3327 |        |        |        |        |         |               |  |
| 3328 |        |        |        |        |         |               |  |
| 3329 |        |        |        |        |         |               |  |
| 3330 |        | 007452 |        |        | EVEN    |               |  |
| 3331 |        |        |        |        |         |               |  |
| 3332 | 007452 |        |        |        | ENDMOD  |               |  |
| 3333 |        |        |        |        |         |               |  |
| 3334 | 007452 |        |        |        | BGNMOD  | HPTCODE       |  |
| 3335 |        |        |        |        |         |               |  |
| 3336 | 007452 |        |        |        | BGNHW   |               |  |
| (3)  | 007452 | 000005 |        |        | WORD    | L10013-LSHW'2 |  |
| 3337 |        |        |        |        |         |               |  |
| 3338 | 007454 | 174400 |        |        | WORD    | 174400        |  |
| 3339 | 007456 | 000330 |        |        | WORD    | 330           |  |
| 3340 | 007460 | 000240 |        |        | WORD    | 240           |  |
| 3341 | 007462 | 000000 |        |        | WORD    | 0             |  |
| 3342 | 007464 | 000001 |        |        | WORD    | 1             |  |
| 3343 |        |        |        |        |         |               |  |
| 3344 | 007466 |        |        |        | ENDHW   |               |  |
| (3)  | 007466 |        |        |        | L10013  |               |  |
| 3345 |        |        |        |        |         |               |  |

```
3346 007466          ENDMOD
3347
3348          SBTTL  SOFTWARE PARAMETERS
3349
3350 007466          BGNMOD  SPTCODE
3351
3352 007466          BGNSW
(3) 007466 000037      WORD  L10014-LSSW/2
3353
3354 007470 000001      LIMIT  WORD  1          ,RETRY LIMIT
3355 007472 000003      ERLMT  WORD  3          ,ERROR LIMIT
3356 007474 000003      SELMT  WORD  3          ,SEEK ERROR LIMIT
3357 007476 060650      DALMT  WORD  25000      ,DATA XFER LIMIT (*(10*3)) (BITS)
3358 007500 023420      SKLMT  WORD  10000      ,SEEK LIMIT
3359 007502 000170      TYINT  WORD  120        ,TIME INTERVAL BETW/ STATISTICAL REPORT
3360 007504 000030      CMRD   WORD  24         ,COMPARE ON READ
3361 007506 000003      DELMT  WORD  3          ,ERRORS TO REPORT ON DATA COMPARE
3362 007510 000000      XCHFLG WORD  0          ,CHANGE OTHER PARAMETERS
3363 007512 002400      T MXB   WORD  1280      ,MAXIMUM R/W TRANSFER BUFFER
3364 007514 000100      T MXH   WORD  100      ,MAXIMUM HEAD SELECT
3365 007516 000000      T MNH   WORD  0          ,MINIMUM HEAD SELECT
3366 007520 077600      T MXC   WORD  77600    ,MAXIMUM CYLINDER
3367 007522 000000      T MNC   WORD  0          ,MINIMUM CYLINDER
3368 007524 000047      T MXS   WORD  39        ,MAXIMUM SECTOR
3369 007526 000000      T MNS   WORD  0          ,MINIMUM SECTOR
3370 007530 000001      T DCK   WORD  1          ,DATA DUMP ON DATA CHECK ERROR
3371 007532 000001      T DRP   WORD  1          ,DROP ON LIMIT REACHED
3372 007534 000003      T MNB   WORD  3          ,MINIMUM BUFFER TRANSFER SIZE
3373 007536 000012      SFLMT  WORD  10        ,SOFT ERROR LIMIT
3374 007540 000000      T STA   WORD  0          ,DROP DRIVE ON PERFORMANCE REACHED
3375 007542 000003      DPLMT  WORD  3          ,DRIVE ERROR LIMIT
3376 007544 000000      T POF   WORD  0          ,READ ONLY FLAG
3377 007546 000001      T RAN   WORD  1          ,RANDOM SELECT OF PATTERNS
3378 007550 000004      T PAT   WORD  4          ,ONLY ONE PATTERN 4 = WORST CASE
3379 007552 000001      T SLT   WORD  1          ,SEEK RETRY LIMIT
3380 007554 000200      T CLT   WORD  128      ,NUMBER OF ERRORS ON DCK DUMP
3381 007556 000000      T AUT   WORD  0          ,AUTO ON START UP
3382 007560 000000      T STIP  WORD  0          ,RESTRICT BUFFER SIZE
3383 007562 000001      T WCK   WORD  1          ,DO WRITE CHECK
3384 007564 000012      T DCD   WORD  10
3385
3386 007566          ENDSW
(3) 007566          L10014
3387
3388 007566          ENDMOD
3389
3390 007566          BGNMOD  DSPCODE
3391
3392 007566          DISPATCH  1
(4) 007566 000001      WORD  1
(6) 007570 012320      WORD  T1
3393
3394 007572          ENDMOD
3395
3396          SBTTL  STATISTIC CODE
3397
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|      |        |        |        |            |                     |   |
|------|--------|--------|--------|------------|---------------------|---|
| 3398 | 007572 |        |        | BGNMOD     | RPTCODE             |   |
| 3399 |        |        |        |            |                     |   |
| 3400 | 007572 |        |        | BGNRPT     |                     |   |
| 3401 |        |        |        |            |                     |   |
| 3402 |        |        |        |            |                     |   |
| 3403 | 007572 |        |        | PRINTS     | #FMTS1              | ;PRINT STATISTICAL HEADER               |
| (7)  | 007572 | 012746 | 006703 | MOV        | #FMTS1, -(SP)       |   |
| (6)  | 007576 | 012746 | 000001 | MOV        | #1, -(SP)           |   |
| (3)  | 007602 | 010600 |        | MOV        | SP, R0              |   |
| (4)  | 007604 | 104016 |        | EMT        | C\$PNTS             |   |
| (4)  | 007606 | 062706 | 000004 | ADD        | #4, SP              |   |
| 3404 |        |        |        |            |                     |   |
| 3405 | 007612 | 010446 |        | MOV        | R4, -(SP)           | ;SAVE PRESENT VALUE OF R4               |
| 3406 |        |        |        |            |                     |   |
| 3407 | 007614 | 012704 | 024752 | MOV        | #DRBUF, R4          | ;START OF DRIVE BUFFER                  |
| 3408 | 007620 | 005764 | 000104 | 15         | TST                 | DCS(R4)                                 |
| 3409 | 007624 | 001402 |        | BEQ        | 25                  | ;IS THERE A DRIVE?<br>;NO, GET NEXT ONE |
| 3410 |        |        |        |            |                     |   |
| 3411 | 007626 | 004737 | 011634 | JSR        | PC, REPORT          | ;TYPE OUT SUMMARY                       |
| 3412 |        |        |        |            |                     |   |
| 3413 | 007632 | 062704 | 000122 | 25         | ADD                 | #FRPOS+2, R4                            |
| 3414 | 007636 | 020427 | 026172 | CMP        | R4, #ENDBUF         | ;NEXT DRIVE<br>;AT THE END?             |
| 3415 | 007642 | 001366 |        | BNE        | 15                  | ;NO, TRY NEXT                           |
| 3416 |        |        |        |            |                     |   |
| 3417 | 007644 | 012604 |        | MOV        | (SP)+, R4           | ;PESTORE R4                             |
| 3418 |        |        |        |            |                     |   |
| 3419 |        |        |        |            |                     |   |
| 3420 | 007646 |        |        | ENDRPT     |                     |   |
| (3)  | 007646 |        |        | L10015     |                     |   |
| (3)  | 007646 | 104025 |        | EMT        | C\$PPT              |   |
| 3421 |        |        |        |            |                     |   |
| 3422 | 007650 |        |        | ENDMOD     |                     |   |
| 3423 |        |        |        |            |                     |   |
| 3424 |        |        |        | SBTTL      | INITIALIZATION CODE |   |
| 3425 |        |        |        |            |                     |   |
| 3426 | 007650 |        |        | BGNMOD     | INITCODE            | ;START OF INITIALIZE CODE               |
| 3427 |        |        |        |            |                     |   |
| 3428 | 007650 |        |        | BGNINIT    |                     |   |
| 3429 |        |        |        |            |                     |   |
| 3430 | 007650 |        |        | SETPRI     | #340                | PRIORITY TO SEVEN                       |
| (3)  | 007650 | 012700 | 000340 | MOV        | #340, P0            |   |
| (3)  | 007654 | 104041 |        | EMT        | C\$SPP1             |   |
| 3431 |        |        |        |            |                     |   |
| 3432 |        |        |        |            |                     |   |
| 3433 | 007656 | 005037 | 000050 | CLR        | OPFLG               |   |
| 3434 | 007662 | 005037 | 002312 | CLR        | INCALL              |   |
| 3435 | 007666 | 005037 | 002266 | CLR        | STFLG               |   |
| 3436 | 007672 | 005037 | 002270 | CLR        | CNTFLG              | ;CLEAR CONT                             |
| 3437 | 007676 |        |        | READEF     | #EF PWR             |   |
| (3)  | 007676 | 012700 | 000034 | MOV        | #EF PWR, P0         |   |
| (3)  | 007702 | 104050 |        | EMT        | C\$REFG             |   |
| 3438 | 007704 |        |        | BNCOMPLETE | 35                  |   |
| (2)  | 007704 | 103076 |        | BCC        | 35                  |   |
| 3439 | 007706 | 005237 | 002262 | INC        | PWRFLG              | INDICATE POWER FAIL                     |
| 3440 | 007712 | 012704 | 024752 | MOV        | #DRBUF R4           |   |
| 3441 | 007716 | 012702 | 000001 | MOV        | #1, R2              |   |

|      |        |        |        |        |         |            |                 |                                      |
|------|--------|--------|--------|--------|---------|------------|-----------------|--------------------------------------|
| 3442 | 007722 | 130237 | 002120 |        | 115     | BITB       | R2, DRUT        |                                      |
| 3443 | 007726 | 001446 |        |        |         | BEQ        | 135             |                                      |
| 3444 | 007730 | 016400 | 000106 |        |         | MOV        | DRSEL(R4), R0   |                                      |
| 3445 | 007734 | 052700 | 000200 |        |         | BIS        | #200, R0        |                                      |
| 3446 | 007740 | 010074 | 000104 |        |         | MOV        | R0, @DCS(R4)    |                                      |
| 3447 | 007744 | 012701 | 000074 |        |         | MOV        | #60, R1         |                                      |
| 3448 | 007750 | 032774 | 000001 | 000104 | 125     | BIT        | #1, @DCS(R4)    |                                      |
| 3449 | 007756 | 001014 |        |        |         | BNE        | 155             |                                      |
| 3450 | 007760 |        |        |        |         | WAITMS     | #10,            |                                      |
| (3)  | 007760 | 012700 | 000012 |        |         | MOV        | #10, R0         |                                      |
| (2)  | 007764 | 104026 |        |        |         | EMT        | CSWTH           |                                      |
| 3451 | 007766 | 005301 |        |        |         | DEC        | R1              |                                      |
| 3452 | 007770 | 001367 |        |        |         | BNE        | 125             |                                      |
| 3453 |        |        |        |        |         |            |                 |                                      |
| 3454 | 007772 | 012737 | 003672 | 002116 |         | MOV        | #NOPIR, WHY     |                                      |
| 3455 | 010000 | 004537 | 020144 |        |         | JSR        | R5, DRDRV       |                                      |
| 3456 | 010004 | 000137 | 010044 |        |         | JMP        | 135             |                                      |
| 3457 |        |        |        |        |         |            |                 |                                      |
| 3458 | 010010 | 004537 | 021062 |        | 155     | JSR        | R5, ISDRST      |                                      |
| 3459 | 010014 | 004537 | 022374 |        |         | JSR        | R5, HDHOME      |                                      |
| 3460 | 010020 | 005064 | 000056 |        |         | CLP        | PFPLGS(R4)      |                                      |
| 3461 | 010024 | 005064 | 000036 |        |         | CLP        | RETRY(R4)       |                                      |
| 3462 | 010030 | 005064 | 000076 |        |         | CLR        | DOWCK(R4)       |                                      |
| 3463 | 010034 | 005064 | 000052 |        |         | CLR        | RTYPE(R4)       |                                      |
| 3464 | 010040 | 005064 | 000114 |        |         | CLR        | RSEEK(R4)       |                                      |
| 3465 | 010044 | 062704 | 000122 |        | 105     | ADD        | #PRPOS+2, P4    |                                      |
| 3466 | 010050 | 106302 |        |        |         | ASLB       | R2              |                                      |
| 3467 | 010052 | 103323 |        |        |         | BCC        | 115             |                                      |
| 3468 | 010054 | 005737 | 002250 |        |         | TST        | SYSCLK          |                                      |
| 3469 | 010060 | 001406 |        |        |         | BEQ        | 45              |                                      |
| 3470 | 010062 |        |        |        |         | CLRON      | #1              |                                      |
| (3)  | 010062 | 012700 | 000001 |        |         | MOV        | #1, R0          |                                      |
| (3)  | 010066 | 104034 |        |        |         | EMT        | CSKWON          |                                      |
| 3471 | 010070 |        |        |        |         | REQTIM     | R0              |                                      |
| (3)  | 010070 | 104045 |        |        |         | EMT        | CSREQTIM        |                                      |
| 3472 | 010072 | 010037 | 002224 |        |         | MOV        | R0, LSTTIM      |                                      |
| 3473 | 010076 | 000137 | 011046 |        | 45      | JMP        | POWER           |                                      |
| 3474 | 010102 |        |        |        | 35      | READEF     | #EF CONTINUE    | CONTINUE FROM CONSOLE?               |
| (3)  | 010102 | 012700 | 000036 |        |         | MOV        | #EF CONTINUE PG |                                      |
| (3)  | 010106 | 104050 |        |        |         | EMT        | CSREFG          |                                      |
| 3475 | 010110 |        |        |        |         | BNCOMPLETE | 15              | NO CONTINUE W/ INIT CODE             |
| (2)  | 010110 | 103004 |        |        |         | BCC        | 15              |                                      |
| 3476 |        |        |        |        |         |            |                 |                                      |
| 3477 | 010112 | 005237 | 002270 |        |         | INC        | CNTFLG          | YES SET CONT FLAG. GO TO END OF INIT |
| 3478 | 010116 | 000137 | 010450 |        |         | JMP        | END             |                                      |
| 3479 |        |        |        |        |         |            |                 |                                      |
| 3480 | 010122 | 004537 | 023616 |        | 15      | JSR        | R5, CLEAR       | CLEAR ALL DRIVE BUFFERS              |
| 3481 | 010126 | 012737 | 176543 | 002124 |         | MOV        | #176543, MINUM  | PRIME RANDOM GENERATOR               |
| 3482 | 010134 | 012737 | 123456 | 002126 |         | MOV        | #123456, LONUM  |                                      |
| 3483 | 010142 | 012700 | 002134 |        | 25      | MOV        | #CNTLR1, P0     | CLEAR FLAGS                          |
| 3484 | 010146 | 005020 |        |        | CLP DAT | CLR        | (R0)+           |                                      |
| 3485 | 010150 | 020027 | 002270 |        |         | CMP        | R0, #STFLG+2    | MASS CLEAR                           |
| 3486 | 010154 | 001374 |        |        |         | BNE        | CLR DAT         |                                      |
| 3487 |        |        |        |        |         |            |                 |                                      |
| 3488 | 010156 | 012704 | 024752 |        |         | MOV        | #DRBUF, P4      | SETUP UP DRIVE BUFFER POINTER        |
| 3489 | 010162 | 012702 | 023724 |        |         | MOV        | #BSECC, P2      | SETUP BAD SECTOR POINTER             |

|      |        |        |        |        |            |                |                                      |                           |
|------|--------|--------|--------|--------|------------|----------------|--------------------------------------|---------------------------|
| 3490 | 010166 | 013703 | 002014 |        | MOV        | LSUNIT,R3      | , GET NUMBER OF UNITS                |                           |
| 3491 | 010172 | 010337 | 002260 |        | MOV        | R3, UUT        | , SAVE LSUNIT                        |                           |
| 3492 | 010176 | 005001 |        |        | CLR        | R1             | , INIT P-TABLE                       |                           |
| 3493 | 010200 | 005703 |        | 15     | TST        | R3             | , ANY P-TABLES LEFT?                 |                           |
| 3494 | 010202 | 001522 |        |        | BEQ        | END            | , NO, GO TO END                      |                           |
| 3495 | 010204 |        |        |        | GPHARD     | R1, R0         | , GET A P-TABLE                      |                           |
| (3)  | 010204 | 010100 |        |        | MOV        | R1, R0         |                                      |                           |
| (3)  | 010206 | 104042 |        |        | EMT        | C\$GPHRD       |                                      |                           |
| 3496 | 010210 |        |        |        | BNCOMPLETE | 125            |                                      |                           |
| (2)  | 010210 | 103110 |        |        | BCC        | 125            |                                      |                           |
| 3497 | 010212 | 012037 | 002144 |        | MOV        | (R0)+, BCSR    | , GET CSR                            |                           |
| 3498 | 010216 | 012037 | 002146 |        | MOV        | (R0)+, BVEC    | , GET VECTOR                         |                           |
| 3499 | 010222 | 012037 | 002150 |        | MOV        | (R0)+, BPRIOR  | , GET BPRIOR                         |                           |
| 3500 | 010226 | 011037 | 002152 |        | MOV        | (R0), BDRSEL   | , GET DRIVE                          |                           |
| 3501 | 010232 | 005737 | 002134 |        | TST        | CNTRL1         | , DO WE HAVE CSR 1 YET?              |                           |
| 3502 | 010236 | 001011 |        |        | BNE        | 25             | , YES, THEN SEE IF IT'S IT           |                           |
| 3503 | 010240 | 013737 | 002150 | 002212 | MOV        | BPRIOR, PRIOR1 |                                      |                           |
| 3504 | 010246 | 013737 | 002144 | 002134 | MOV        | BCSR, CNTRL1   | , NO, MAKE THIS ONE CSR 1            |                           |
| 3505 | 010254 | 013737 | 002146 | 002206 | MOV        | BVEC, VECT1    | , MAKE THIS VECTOR VECT1             |                           |
| 3506 | 010262 | 023737 | 002144 | 002134 | 25         | CMP            | BCSR, CNTRL1                         | , IS THIS CSR CNTRL1?     |
| 3507 | 010270 | 001012 |        |        | BNE        | 55             | , NO, GO CHECK AGAINST #2            |                           |
| 3508 | 010272 | 023737 | 002146 | 002206 | CMP        | BVEC, VECT1    | , IS VECTOR PROPER?                  |                           |
| 3509 | 010300 | 001050 |        |        | BNE        | 105            | , NO, REPORT ERROR                   |                           |
| 3510 | 010302 | 012737 | 002252 | 002164 | MOV        | #BUF1, TEMP1   | , FIRST CONTROLLER/FIRST BUFFER      |                           |
| 3511 | 010310 | 004537 | 011424 |        | JSR        | R5, FILINF     | , FILL BUFFER                        |                           |
| 3512 | 010314 | 000450 |        |        | BR         | 115            | , GO GET NEXT P-TABLE                |                           |
| 3513 | 010316 | 005737 | 002136 |        | 55         | TST            | CNTRL2                               | , HAVE WE GOT CSR #2 YET? |
| 3514 | 010322 | 001015 |        |        | BNE        | 65             | , YES, CHECK THIS ONE AGAINST IT     |                           |
| 3515 | 010324 | 023737 | 002206 | 002144 | CMP        | VECT1 BCSR     | , IS THIS VECTOR SAME AS CNTRL1      |                           |
| 3516 | 010332 | 001433 |        |        | BEQ        | 105            | , IF SO, DON'T ALLOW IT              |                           |
| 3517 | 010334 | 013737 | 002144 | 002136 | MOV        | BCSR, CNTRL2   | , MAKE THIS ONE CSR 2                |                           |
| 3518 | 010342 | 013737 | 002146 | 002210 | MOV        | BVEC, VECT2    | , SETUP SECOND VECTOR                |                           |
| 3519 | 010350 | 013737 | 002150 | 002214 | MOV        | BPRIOR, PRIOR2 |                                      |                           |
| 3520 | 010356 | 023737 | 002144 | 002136 | 65         | CMP            | BCSR, CNTRL2                         | , IS THIS CSR # 2?        |
| 3521 | 010364 | 001016 |        |        | BNE        | 105            | , NO, WELL WE DON'T ALLOW 3          |                           |
| 3522 | 010366 | 023737 | 002146 | 002210 | CMP        | BVEC, VECT2    | , DOES IT HAVE PROPER VECTOR         |                           |
| 3523 | 010374 | 001012 |        |        | BNE        | 105            | , NO, GO REPORT ERROR                |                           |
| 3524 | 010376 | 023737 | 002210 | 002206 | CMP        | VECT2, VECT1   | , IS VECTOR OF FIRST EQUAL TO        |                           |
| 3525 | 010404 | 001406 |        |        | BEQ        | 105            | , VECTOR OF SECOND, YES REPORT ERROR |                           |
| 3526 | 010406 | 012737 | 002254 | 002164 | MOV        | #BUF2, TEMP1   | , OTHER CNTRL/OTHER BUFFER           |                           |
| 3527 | 010414 | 004537 | 011424 |        | JSR        | R5, FILINF     | , LOAD BUFFER                        |                           |
| 3528 | 010420 | 000406 |        |        | BR         | 115            | , NEXT                               |                           |
| 3529 | 010422 |        |        | 105    | ERRDF      | 160            | , ILLEG. EPP10                       |                           |
| (3)  | 010422 | 104462 |        |        | TRAP       | T\$ERCODE      |                                      |                           |
| (5)  | 010424 | 000240 |        |        | WORD       | 160            |                                      |                           |
| (5)  | 010426 | 003560 |        |        | WORD       | ILLEG          |                                      |                           |
| (5)  | 010430 | 005100 |        |        | WORD       | ERR10          |                                      |                           |
| 3530 | 010432 | 005064 | 000104 |        | 125        | CLR            | DCS(R4)                              |                           |
| 3531 | 010436 | 005201 |        |        | 115        | INC            | R1                                   | , POINT TO NEXT           |
| 3532 | 010440 | 005303 |        |        | DEC        | P3             | , DOWN COUNT                         |                           |
| 3533 | 010442 | 062702 | 000040 |        | ADD        | #32, R2        | , NEXT BAD SECTOR FILE               |                           |
| 3534 | 010446 | 000654 |        |        | BR         | 15             | , DO WHILE                           |                           |
| 3535 |        |        |        |        |            |                |                                      |                           |
| 3536 |        |        |        |        |            |                |                                      |                           |
| 3537 | 010450 |        |        |        | END        |                |                                      |                           |
| 3538 |        |        |        |        |            |                |                                      |                           |

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3539 010450 012737 177770 002122      MOV      #177770, SYMSK      ; SETUP FOR EIGHT DRIVES
3540 010456 023727 002260 000004      CMP      UUT, #4           ; MORE THAN FOUR
3541 010464 003012                    BGT      2$               ; YES, THEN MASK IS OKAY
3542 010466 052737 000004 002122      BIS      #4, SYMSK        ; SETUP FOR FOUR DRIVES
3543 010474 023727 002260 000002      CMP      UUT, #2           ; MORE THAN TWO
3544 010502 003003                    BGT      2$               ; YES, IT'S OKAY
3545 010504 052737 000002 002122      BIS      #2, SYMSK        ; SET FOR ONE OR TWO
3546 010512                    2$ READEF  #EF, START      ; START COMMAND
(3) 010512 012700 000040      MOV      #EF, START, RO
(3) 010516 104050      EMT      CSREFG
3547 010520                    BNCOMPLETE RESTART      ; NO, CHK RESTART
(2) 010520 103002      BCC      RESTART
3548 010522 005237 002266      INC      STFLG            ; SET START INDICATOR
3549
3550 010526 005737 002270      RESTART TST      CNTFLG   ; CONTINUING
3551 010532 001024      BNE      3$               ; YES GO TO 3$
3552
3553
3554      ; LET'S CREATE INTERNAL BITMAP
3555
3556 010534 012701 000001      MOV      #1, R1           ; BIT MASK
3557 010540 105037 002121      CLRB    DRPRS            ; CLEAR OUT DRIVES PRESENT
3558 010544 012704 024752      MOV      #DRBUF, R4      ; START OF DRIVE BUFFERS
3559 010550 005764 000104      1$ TST      DCS(R4)       ; ANY CSR?
3560 010554 001402                    BEQ      2$               ; NO, NO DRIVE THEN
3561 010556 150137 002121      BISB    R1, DRPRS        ; INDICATE DRIVE IN BITMAP
3562 010562 006301                    2$ ASL      R1             ; NEXT POSITION
3563 010564 062704 000122      ADD     #PRPOS+2, R4     ; NEXT DRIVE BUFFER
3564 010570 022704 026172      CMP     #ENDBUF, R4     ; DONE
3565 010574 001365                    BNE     1$               ; NO
3566
3567 010576 113737 002121 002120      MOVB    DRPRS, DRUT     ; SET UP DRIVES UNDER TEST
3568
3569 010604                    3$
3570
3571 010604      SETVEC  VECT1, #INTR1, PRIOR1 ; SET CONTROLLER 1'S VECTOR
(7) 010604 013746 002212      MOV     PRIOR1, -(SP)
(6) 010610 012746 014152      MOV     #INTR1, -(SP)
(5) 010614 013746 002206      MOV     VECT1, -(SP)
(4) 010620 012746 000003      MOV     #3, -(SP)
(3) 010624 104037      EMT     CSSVEC
(2) 010626 062706 000010      ADD     #10, SP
3572
3573 010632 005737 002136      TST     CNTLR2          ; RUNNING TWO CONTROLLERS?
3574 010636 001413                    BEQ     4$               ; NO
3575
3576 010640      SETVEC  VECT2, #INTR2, PRIOR2 ; YES SET CONTROLLER 2'S VECTOR
(7) 010640 013746 002214      MOV     PRIOR2, -(SP)
(6) 010644 012746 014162      MOV     #INTR2, -(SP)
(5) 010650 013746 002210      MOV     VECT2, -(SP)
(4) 010654 012746 000003      MOV     #3, -(SP)
(3) 010660 104037      EMT     CSSVEC
(2) 010662 062706 000010      ADD     #10, SP
3577
3578 010666 005737 002270      4$ TST     CNTFLG        ; CONTINUE?
3579 010672 001412                    BEQ     FINDBF          ; NO, GO PAST RESTART OF CLOCK
  
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3626
3627
3628 011046          ENDINIT
      (3) 011046          L10016 EMT      CSINIT
      (3) 011046 104011
3629
3630 011050          ENDMOD
3631
3632 011050          BGNMOD  CLNCODE
3633
3634
3635 011050          BGNCLN
3636
3637 011050          SETVEC  ERRVEC, #TRPHAN, #340
      (3) 011050 012746 000340  MOV      #340, -(SP)
      (6) 011054 012746 011626  MOV      #TRPHAN, -(SP)
      (5) 011060 013746 002302  MOV      ERRVEC, -(SP)
      (4) 011064 012746 000003  MOV      #3, -(SP)
      (3) 011070 104037          EMT      CSSVEC
      (2) 011072 062706 000010  ADD      #10, SP
3638 011076          SETPRI  #FR100          . PRIORITY TO ZERO
      (3) 011076 012700 000000  MOV      #PRI00, RD
      (3) 011102 104041          EMT      CSSPRI
3639
3640 011104 032777 000200 171022 15  BIT      #CRDY, @CNTLR1          . WAIT FOR CONTROLLER TO FINISH
3641 011112 001774          BEQ      15
3642 011114 042777 000100 171012          BIC      #INTEN, @CNTLR1          . CLEAR INTERRUPT IF PENDING
3643 011122          CLRVEC  VECT1          . RELEASE VECTOP OF FIRST CONTROLLER
      (3) 011122 013700 002206  MOV      VECT1, RD
      (3) 011126 104036          EMT      CSCVEC
3644
3645 011130 005737 002136          TST      CNTLR2          . TWO CONTROLLERS
3646 011134 001412          BEQ      35          NO
3647
3648 011136 032777 000200 170772 25  BIT      #CRDY, @CNTLR2          . WAIT FOR OTHER CONTROLLER TO FINISH
3649 011144 001774          BEQ      25
3650 011146 042777 000100 170762          BIC      #INTEN, @CNTLR2          . CLEAR OUT INTERRUPT ENABLE
3651 011154          CLRVEC  VECT2          . YES WE'LL RELEASE IT'S VECTOR
      (3) 011154 013700 002210  MOV      VECT2, RD
      (3) 011160 104036          EMT      CSCVEC
3652
3653 011162 005037 002312          CLR      INCALL          35
3654 011166 005037 002310          CLR      OPCALL
3655 011172          CLRVEC  ERRVEC
      (3) 011172 013700 002302  MOV      ERRVEC, RD
      (3) 011176 104036          EMT      CSCVEC
3656
3657 011200          ENDCLN
      (3) 011200          L10017 EMT      CSCLEAN
      (3) 011200 104012
3658
3659 011202          ENDMOD
3660
3661
3662 011202          BGNMOD  ADDCODE
3663
  
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3664 011202          BGNAU
3665
3666 011202 012704 024752      MOV    #DRBUF,R4      , START OF DRIVE BUFFERS
3667 011206 012701 000001      MOV    #1,R1          , MASK TO FIND DRIVE
3668 011212 010002              MOV    R0,R2          , SAVE WHICH TO FIND
3669 011214 005700          15    TST    R0          , THIS ONE
3670 011216 001405              BEQ    25              , YES
3671 011220 062704 000122      ADD    #PRPOS+2,R4    , NEXT
3672 011224 006301              ASL    R1              , NEXT MASK
3673 011226 005300              DEC    R0
3674 011230 000771              BR     15
3675 011232 150137 002120      25    B1SB   R1,DRUT      , INSERT 'N DRIVE UNDER TEST
3676 011236              GPWARD  R2,R1
3677 011236 010200              MOV    R2,R0
3678 011240 104042              EMT    C$GPHRD
3679 011242 010001              MOV    R0,R1
3680 011244 011164 000104      MOV    (R1),DCS(R4)
3681 011250 012700 000100      MOV    #SERNM1,R0    , SETUP TO CLEAR STATS
3682 011254 006200              ASR    R0
3683 011256 005024          45    CLP    (R4)+
3684 011260 005300              DEC    R0
3685 011262 001375              BNE   45
3686 011264          55
3687 011264          ENDAU
3688 (3) 011264          L10020
3689 (3) 011264 104054          EMT    C$AU
3690 011266          ENDMOD
3691 011266          BGNMOD DRUPCODE
3692 011266          BGNDU
3693 011266 005737 002312      TST    INCALL
3694 011272 001015          BNE   35
3695 011274 012704 024752      MOV    #DRBUF,R4
3696 011300 005700          25    TST    R0
3697 011302 001404          BEQ    15
3698 011304 005300          DEC    R0
3699 011306 062704 000122      ADD    #PRPOS+2,R4
3700 011312 000772          BR     25
3701
3702 011314 012737 007277 002116 15    MOV    #REQ WHY
3703 011322 004537 020140          JSR   R5,ORDRPM
3704 011326          35
3705
3706
3707 011326          ENDDU
3708 (3) 011326          L10021
3709 (3) 011326 104055          EMT    C$DU
3710 011330          ENDMOD
3711          SBTTL  GLOBAL SUBROUTINES
3712
  
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3713 011330          BGNMOD  GLBSUB
3714
3715 011330 012701 000010  SETWCK  MOV      #8 ,R1
3716 011334 012702 024752      MOV      #DRBUF,R2
3717 011340 026462 000104 000104 1$    CMP      DCS(R4),DCS(R2)
3718 011346 001002          BNE      2$
3719 011350 010462 000076      MOV      R4,DOWCK(R2)
3720 011354 062702 000122      2$    ADD      #PRPOS+2,R2
3721 011360 005301          DEC      R1
3722 011362 001366          BNE      1$
3723 011364 000205          RTS      R5
3724
3725 011366 012701 000010  CLRWCK  MOV      #8 ,R1
3726 011372 012702 024752      MOV      #DRBUF,R2
3727 011376 026462 000104 000104 1$    CMP      DCS(R4),DCS(R2)
3728 011404 001002          BNE      2$
3729 011406 005062 000076      CLR      DOWCK(R2)
3730 011412 062702 000122      2$    ADD      #PRPOS+2,R2
3731 011416 005301          DEC      R1
3732 011420 001366          BNE      1$
3733 011422 000205          RTS      R5
3734
3735
3736          .ROUTINE TO FILL BUFFERS WITH INFO
3737
3738 011424 013764 002152 000106  FILINF  MOV      BDRSEL,DRSEL(R4)      .SET DRIVE SELECT BITS
3739 011432 013764 002144 000104      MOV      BCSR,DCS(R4)      .SET CSR
3740 011440 013764 002164 000110      MOV      TEMP1,BBA(R4)      .SET R/W BUFFER
3741 011446 010264 000112      MOV      R2,BSECT(R4)      .SETUP BAD SECTOR POINTER
3742 011452 005737 007556      TST      T AUT      .DO WE AUTOSIZE?
3743 011456 001460          BEQ      1$      .NO. SKIP
3744
3745 011460 005037 002264          CLR      TRPFLG      .CLEAR TRAP FLAG
3746 011464          SETVEC  ERRVEC,#TRPHAN,#340  .SETUP TO CATCH TRAP
(7) 011464 012746 000340      MOV      #340,-(SP)
(6) 011470 012746 011626      MOV      #TRPHAN,-(SP)
(5) 011474 013746 002302      MOV      ERRVEC,-(SP)
(4) 011500 012746 000003      MOV      #3,-(SP)
(3) 011504 104037          EMT      CSSVEC
(2) 011506 062706 000010      ADD      #10,SP
3747 011512 005774 000104      TST      @DCS(R4)
3748 011516 005737 002264      TST      TRPFLG      .DID TRAP OCCUR
3749 011522 001012          BNE      3$      .YES IGNORE DRIVE
3750 011524 016400 000106      MOV      DRSEL(R4),R0      .YES, FIND OUT IF DRIVE
3751 011530 052700 000200      BIS      #200,R0      .HAS DRIVE READY POSTED
3752 011534 010074 000104      MOV      R0,@DCS(R4)
3753 011540 032774 000001 000104  BIT      #1,@DCS(R4)      .IS DRIVE READY HIGH?
3754 011546 001021          BNE      2$      .YES, CHECK NEXT
3755
3756 011550          3$    PRINTF  #FRMT16,DCS(R4),(<B DRSEL+1(R4)>)
(9) 011550 005046          CLR      -(SP)
(9) 011552 156416 000107      BISB    DRSEL+1(R4),(SP)
(8) 011556 016446 000104      MOV      DCS(R4),-(SP)
(7) 011562 012746 006634      MOV      #FRMT16,-(SP)
(6) 011566 012746 000003      MOV      #3,-(SP)
(3) 011572 010600          MOV      SP,R0
  
```

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(4) 011574 104017          EMT  C$PNTF
(4) 011576 062706 000010  ADD  #10, SP
3757
3758 011602 005337 002260          DEC  UUT          , ONE LESS DRIVE NOW
3759 011606 005064 000104          CLR  DCS(R4)      ; TAKE DRIVE OUT OF BUFFER
3760 011612          2$          CLRVEC ERRVEC      ; RELEASE THE VECTOR
(3) 011612 013700 002302          MOV  ERRVEC, R0
(3) 011616 104036          EMT  C$CVEC
3761 011620 062704 000122          1$          ADD  #PRPOS+2, R4      , UPDATE POINTER
3762 011624 000205          RTS  R5
3763 011626 005237 011626  TRPHAN INC  TRPHAN
3764 011632 000002          RTI
3765
3766          , ROUTINE TO PRINT STATISTICAL REPORT OF DRIVE(S)
3767
3768 011634          REPORT
3769
3770 011634          PRINTS #FMT1, #TIME, HOUR, MINUTE, SECOND, # IPLCS, DCS(R4), #DRNM, <B, DRSEL+1(R4)>
(15) 011634 005046          CLR  -(SP)
(15) 011636 156416 000107          BISB DRSEL+1(R4), (SP)
(14) 011642 012746 003620          MOV  #DRNM, -(SP)
(13) 011646 016446 000104          MOV  DCS(R4), -(SP)
(12) 011652 012746 002323          MOV  #MRLCS, -(SP)
(11) 011656 013746 002226          MOV  SECOND, -(SP)
(10) 011662 013746 002230          MOV  MINUTE, -(SP)
(9) 011666 013746 002232          MOV  HOUR, -(SP)
(8) 011672 012746 002314          MOV  #TIME, -(SP)
(7) 011676 012746 005626          MOV  #FMT1, -(SP)
(6) 011702 012746 000011          MOV  #11, -(SP)
(3) 011706 010600          MOV  SP, R0
(4) 011710 104016          EMT  C$PNTS
(4) 011712 062706 000024          ADD  #24, SP
3771
3772 011716 005764 000070          TST  DPHOUR(R4)      , DO WE HAVE ANY DROPPED TIME
3773 011722 001417          BEQ  1$              , NO, THEN PRINT PLANN NG
3774
3775 011724          PRINTS #FMTS1B, <B, DPHOUR(R4) , <B, DPMIN(R4)
(9) 011724 005046          CLR  -(SP)
(9) 011726 156416 000071          BISB DPMIN(R4), (SP)
(8) 011732 005046          CLR  -(SP)
(8) 011734 156416 000070          BISB DPHOUR(R4), (SP)
(7) 011740 012746 006777          MOV  #FMTS1B, -(SP)
(6) 011744 012746 000003          MOV  #3, -(SP)
(3) 011750 010600          MOV  SP, R0
(4) 011752 104016          EMT  C$PNTS
(4) 011754 062706 000010          ADD  #10, SP
3776 011760 000410          BR   2$
3777
3778 011762          1$          PRINTS #FMTS1A
(7) 011762 012746 006761          MOV  #FMTS1A, -(SP)
(6) 011766 012746 000001          MOV  #1, -(SP)
(3) 011772 010600          MOV  SP, R0
(4) 011774 104016          EMT  C$PNTS
(4) 011776 062706 000004          ADD  #4, SP
3779 012002          2$          PRINTS #FMTS2, #CART, SEPNM2(P4) SEPNM1(P4)
3780 012002
  
```

|      |        |        |        |        |   |
|------|--------|--------|--------|--------|---|
| (10) | 012002 | 016446 | 000100 | MOV    | SERNM1(R4), -(SP)   |
| (9)  | 012006 | 016446 | 000102 | MOV    | SERNM2(R4), -(SP)   |
| (8)  | 012012 | 012746 | 002430 | MOV    | #CART, -(SP)  |
| (7)  | 012016 | 012746 | 007030 | MOV    | #FMTS2, -(SP)   |
| (6)  | 012022 | 012746 | 000004 | MOV    | #4, -(SP)   |
| (3)  | 012026 | 010600 |        | MOV    | SP, R0  |
| (4)  | 012030 | 104016 |        | EMT    | C\$PNTS   |
| (4)  | 012032 | 062706 | 000012 | ADD    | #12, SP   |
| 3781 | 012036 |        |        | PRINTS | #FMTS2A, SKCNT(R4), SKCNT1(R4), RXFR3(R4), RXFR2(R4), RXFR1(R4) |
| (12) | 012036 | 016446 | 000002 | MOV    | RXFR1(R4), -(SP)  |
| (11) | 012042 | 016446 | 000004 | MOV    | RXFR2(R4), -(SP)  |
| (10) | 012046 | 016446 | 000060 | MOV    | RXFR3(R4), -(SP)  |
| (9)  | 012052 | 016446 | 000054 | MOV    | SKCNT1(R4), -(SP)   |
| (8)  | 012056 | 016446 | 000000 | MOV    | SKCNT(R4), -(SP)  |
| (7)  | 012062 | 012746 | 007043 | MOV    | #FMTS2A, -(SP)  |
| (6)  | 012066 | 012746 | 000006 | MOV    | #6, -(SP)   |
| (3)  | 012072 | 010600 |        | MOV    | SP, R0  |
| (4)  | 012074 | 104016 |        | EMT    | C\$PNTS   |
| (4)  | 012076 | 062706 | 000016 | ADD    | #16, SP   |
| 3782 | 012102 |        |        | PRINTS | #FMTS2B, WXFR3(R4), WXFR2(R4), WXFR1(R4)                        |
| (10) | 012102 | 016446 | 000006 | MOV    | WXFR1(R4), -(SP)  |
| (9)  | 012106 | 016446 | 000010 | MOV    | WXFR2(R4), -(SP)  |
| (8)  | 012112 | 016446 | 000062 | MOV    | WXFR3(R4), -(SP)  |
| (7)  | 012116 | 012746 | 007130 | MOV    | #FMTS2B, -(SP)  |
| (6)  | 012122 | 012746 | 000004 | MOV    | #4, -(SP)   |
| (3)  | 012126 | 010600 |        | MOV    | SP, R0  |
| (4)  | 012130 | 104016 |        | EMT    | C\$PNTS   |
| (4)  | 012132 | 062706 | 000012 | ADD    | #12, SP   |
| 3783 | 012136 |        |        | PRINTS | #FMTS3, DERCNT(R4), SKECNT(R4), TREPR(R4), DATCER(R4)           |
| (11) | 012136 | 016446 | 000074 | MOV    | DATCER(R4), -(SP)   |
| (10) | 012142 | 016446 | 000072 | MOV    | TREPR(R4), -(SP)  |
| (9)  | 012146 | 016446 | 000016 | MOV    | SKECNT(R4), -(SP)   |
| (8)  | 012152 | 016446 | 000020 | MOV    | DERCNT(R4), -(SP)   |
| (7)  | 012156 | 012746 | 007174 | MOV    | #FMTS3, -(SP)   |
| (6)  | 012162 | 012746 | 000005 | MOV    | #5, -(SP)   |
| (3)  | 012166 | 010600 |        | MOV    | SP, R0  |
| (4)  | 012170 | 104016 |        | EMT    | C\$PNTS   |
| (4)  | 012172 | 062706 | 000014 | ADD    | #14, SP   |
| 3784 | 012176 |        |        | PRINTS | #FMTS3A, ERRCNT(R4), SFTCNT(R4)                                 |
| (9)  | 012176 | 016446 | 000014 | MOV    | SFTCNT(R4), -(SP)   |
| (8)  | 012202 | 016446 | 000012 | MOV    | ERRCNT(R4), -(SP)   |
| (7)  | 012206 | 012746 | 007275 | MOV    | #FMTS3A, -(SP)  |
| (6)  | 012212 | 012746 | 000003 | MOV    | #3, -(SP)   |
| (3)  | 012216 | 010600 |        | MOV    | SP, R0  |
| (4)  | 012220 | 104016 |        | EMT    | C\$PNTS   |
| (4)  | 012222 | 062706 | 000010 | ADD    | #10, SP   |
| 3785 | 012226 |        |        | PRINTS | #FMTS4, DCR CER(R4), HCP CER(R4), NYMCNT(R4), HNFERR(R4)        |
| (11) | 012226 | 016446 | 000032 | MOV    | HNFERR(R4), -(SP)   |
| (10) | 012232 | 016446 | 000034 | MOV    | NYMCNT(R4), -(SP)   |
| (9)  | 012236 | 016446 | 000024 | MOV    | HCP CER(R4), -(SP)  |
| (8)  | 012242 | 016446 | 000022 | MOV    | DCR CER(R4), -(SP)  |
| (7)  | 012246 | 012746 | 007330 | MOV    | #FMTS4, -(SP)   |
| (6)  | 012252 | 012746 | 000005 | MOV    | #5, -(SP)   |
| (3)  | 012256 | 010600 |        | MOV    | SP, R0  |
| (4)  | 012260 | 104016 |        | EMT    | C\$PNTS   |
| (4)  | 012262 | 062706 | 000014 | ADD    | #14, SP   |

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3786 012266          PRINTS #FMTS5,DLTCNT(R4),OPICNT(R4)
(9) 012266 016446 000030      MOV   OPICNT(R4),-(SP)
(8) 012272 016446 000026      MOV   DLTCNT(R4),-(SP)
(7) 012276 012746 007414      MOV   #FMTS5,-(SP)
(6) 012302 012746 000003      MOV   #3,-(SP)
(3) 012306 010600          MOV   SP,R0
(4) 012310 104016          EMT   C$PNTS
(4) 012312 062706 000010      ADD   #10,SP
3787 012316 000207          RTS   PC
3788
3789
3790 012320          ENDMOD
3791
3792          SBTTL PROGRAM MAIN LOOP
3793
3794 012320          BGNTST
3795          ,MAIN PROGRAM LOOP
3796          ,PROGRAM WILL RANDOMLY PICK ONE OF THE DRIVES TO
3797          ,PERFORM AN OPERATION WE WILL ALWAYS PICK ONE OF FOUR
3798          ,OR EIGHT DRIVES (ONE OR TWO CONTROLLERS) "DRUT" WILL BE
3799          ,CHECKED TO SEE IF DRIVE IS ON SYSTEM ONCE DRIVE IS PICKED
3800          ,THEN A FUNCTION WILL BE SELECTED RANDOMLY FOR THAT
3801          ,DRIVE FUNCTIONS OF CONTROLLER RESET, GET STATUS, SEEK, READ, WRITE
3802          ,WILL BE SELECTED, EACH FUNCTION WILL HAVE IT'S OWN ROUTINE
3803          ,TO GET PARAMETEPS FOR THE DRIVE
3804
3805 012320 079717 000001      MTEST TST   RWPFLG
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DZPLER P11 14-NOV-77 14 04 PROGRAM MAIN LOOP

D 5

SEQ 0055

3E07 012324 001054

BNE 125

, IF POWER FAIL SKIP

|      |        |        |        |        |      |                    |                       |
|------|--------|--------|--------|--------|------|--------------------|-----------------------|
| 3809 | 012326 | 012704 | 024752 |        | MOV  | #DRBUF,R4          | ,GET DRIVE BUFFERS    |
| 3810 | 012332 | 012701 | 000001 |        | MOV  | #1,R1              | ,MASK                 |
| 3811 | 012336 | 130137 | 002120 | 165    | BITB | R1,DRUT            | ,DRIVE UNDER TEST     |
| 3812 | 012342 | 001441 |        |        | BEQ  | 155                | ,NO                   |
| 3813 |        |        |        |        |      |                    |                       |
| 3814 | 012344 | 012774 | 000200 | 000104 | MOV  | #200,@DCS(R4)      | ,CHECK IF DRIVE THERE |
| 3815 | 012352 | 056474 | 000106 | 000104 | BIS  | DRSEL(R4),@DCS(R4) |                       |
| 3816 | 012360 | 012700 | 000012 |        | MOV  | #10,R0             | ,STALL                |
| 3817 | 012364 | 005300 |        | 135    | DEC  | R0                 | .                     |
| 3818 | 012366 | 001376 |        |        | BNE  | 135                |                       |

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3820 012370 032774 000001 000104          BIT  #DRDY, DRCS(R4)
3821 012376 001006          BNE  14$
3822
3823 012400 012737 002460 002116          MOV  #ONRDY, WHY
3824 012406 004537 020144          JSR  R5, DRDRV
3825 012412 000415          BR   15$
3826
3827 012414 004537 017432          14$ JSR  R5, ROBDSC          ; GO GET BAD SECTORS
3828 012420 005064 000056          CLR  PRFLGS(R4)
3829 012424 005064 000076          CLR  DOWCK(R4)
3830 012430 005064 000114          CLR  RSEEK(R4)
3831 012434 005737 002266          TST  STFLG
3832 012440 001402          BEQ  15$
3833
3834 012442 004537 021236          JSP  R5, WRPACK
3835
3836
3837 012446 062704 000122          15$ ADD  #PRPOS+2, R4          ; NEXT DRIVE
3838 012452 106301          ASLB R1          ; DONE?
3839 012454 103330          BCC  16$          ; NO GO FOR NEXT ONE
3840 012456          12$ PRINTF #FMT14, #MSTART
   (8) 012456 012746 004151          MOV  #MSTART, -(SP)
   (7) 012462 012746 006473          MOV  #FMT14, -(SP)
   (6) 012466 012746 000002          MOV  #2, -(SP)
   (3) 012472 010600          MOV  SP, P0
   (4) 012474 104017          EMT  C$PNTF
   (4) 012476 062706 000006          ADD  #6, SP
3841 012502          SETPR: #0          ; PRIORITY TO ZERO
   (3) 012502 012700 000000          MOV  #0, R0
   (3) 012506 104041          EMT  C$SPR1
3842 012510 004537 021140          MAIN JSR  R5, RAND          ; GET A DRIVE?(LUN)
3843 012514 013702 002126          MOV  LONUM, R2          ; GET THE SELECTED DRIVE (LUN)
3844 012520 043702 002122          PEROTH BIC  SYMSK, R2          ; MASK TO DRIVES ON SYSTEM
3845 012524 012701 000001          MOV  #1, R1          ; LET'S SEE IF DRIVE IS THERE
3846 012530 005702          1$ TST  R2          ; HAVE WE GOT PROPER MASK YET
3847 012532 001403          BEQ  2$          ; YES, GO TO 2$
3848 012534 006301          ASL  R1          ; NO, SHIFT FOR NEXT DRIVE
3849 012536 005302          DEC  R2          ; DECREMENT DRIVE NUMBER
3850 012540 000773          BR   1$          ; GO CHECK NEW DRIVE NUMBER
3851 012542 105737 002120          2$ TSTB DRUT          ; ANY DRIVES ON LINE
3852 012546 001005          BNE  5$          ; YES, CHECK
3853
3854          ERRSF 170, NODRIV          ; NO DRIVES
   (3) 012550 104421          TRAP TSERCODE
   (5) 012552 000252          WORD 170
   (5) 012554 003606          WORD NODRIV
3855
3856 012556 000137 024744          JMP  ENDOFPROGRAM
3857
3858 012562 130137 002120          5$ BITB R1, DRUT          ; IS THIS DRIVE PRESENT?
3859 012566 001750          BEQ  MAIN          ; NO GO BACK TRY AGAIN
3860
3861          WE NOW HAVE A DRIVE, CHECK TO SEE IF IT'S CONTROLLED
3862          IS FREE BEFORE WE GO ANY FURTHER
3863
3864

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3865
3866 012570 004537 022252 JSR R5,GETSYS ,GET PRESENT TIME OF SYSTEM
3867 012574 023737 002222 007502 CMP INTERVAL,TYINT ,TIME TO PRINT REPORT
3868 012602 002403 BLT 6$ ,NO, PERFORM FUNCTION
3869 012604 005037 002222 CLR INTERVAL ,YES, START INTERVAL OVER
3870
3871 012610 DORPT ,PRINT STATISTICAL REPORT
(3) 012610 104024 EMT CSORPT
3872
3873 012612 012704 024752 6$ MOV #DRBUF,R4 ,GET START OF DRIVE BUFFERS
3874 012616 013702 002126 MOV LONUM,R2 ,GET RANDOM DRIVE BACK (LUN)
3875 012622 043702 002122 BIC SYMSK,R2 ,MASK TO SYSTEM SYS
3876 012626 005702 3$ TST R2 ,DO WE HAVE BUFFER FOR THAT DRIVE
3877 012630 001404 BEQ 4$ ,YES, GO CHECK IT'S CONTROLLER
3878 012632 062704 000122 ADD #PRPOS+2,R4 ,NO, UPDATE FOR NEXT BUFFER
3879 012636 005302 DEC R2 ,DOWN COUNT DRIVE NUMBER (LUN)
3880 012640 000772 BR 3$ ,GO BACK AND CHECK FOR FOUND
3881 012642 032774 000200 000104 4$ BIT #BIT7,DCS(R4) ,CONTROLLER ASSOCIATED WITH DRIVE
3882 012650 001404 BEQ OTHCTL ,BUSY, CHECK OTHER CONTROLLER
3883 012652 032774 000100 000104 BIT #BIT6,DCS(R4) ,INTERRUPT BEEN SERVICED?
3884 012660 001421 BEQ TAGX ,YES, GO DO OPERATION
3885 012662 005737 002136 OTHCTL TST CNTLR2 ,TWO ONTROLLERS?
3886 012666 001710 BEQ MAIN ,NO, FORGET IT
3887 012670 013702 002126 MOV LONUM,R2 ,GET RANDOM NUMBER
3888 012674 026437 000104 000104 CMP DCS(R4),CNTLR1 ,WHICH CNTLR WAS BUSY
3889 012702 001404 BEQ 1$ ,FIRST, SKIP
3890 012704 000261 SEC
3891 012706 006002 ROR R2
3892 012710 000137 012520 JMP PEROTH
3893 012714 000261 1$ SEC
3894 012716 006102 ROL R2
3895 012720 000137 012520 JMP PEROTH
3896
3897 ,WE CAN NOW PROCEED IN GETTING A FUNCTION AND RELATED DATA
3898 ,FOR THE DRIVE RANDOMLY P4 HAS DRIVE BUFFER POINTER
3899
3900 012724 005764 000076 TAGX TST DOWCK(R4) ,WRITE CHECK NEEDED
3901 012730 001407 BEQ 80$ ,NO
3902 012732 016404 000076 MOV DOWCK(R4),P4 ,GET ONE THAT NEEDS TO BE WRCHK'D
3903 012736 012764 000002 000044 MOV #WRCHK,FUNC(R4) ,WRITE CHECK
3904 012744 000137 014002 JMP ISSUE ,ISSUE IT
3905 012750 005764 000036 80$ TST RETPY(R4) ,DOES DRIVE HAVE RETPY IN
3906 012754 001402 BEQ 78$ ,PROGRESS, NO CONTINUE
3907 012756 000137 014002 JMP ISSUE ,GO RETRY COMMAND
3908
3909 012762 005764 000114 78$ TST RSEEK(R4) ,RECOVERY FROM SEEK ERROR
3910 012766 001003 BNE 77$ ,NO
3911 012770 000412 BR GETFNC ,NO CONTINUE
3912 012772 000137 013732 JMP PDDFNC ,GO READ
3913 012776 032764 000001 000056 77$ BIT #SKDON,PPFLGS(R4) ,SEEK BEEN VERIFIED
3914 013004 001002 BNE 79$ ,NO
3915 013006 000137 013324 JMP SAFNC ,GO, TRY TO RECOVER
3916 013012 000137 010650 79$ JMP RDMFNC ,GO VERIFY SEEK
3917
3918 CHECK LIMITS OF ERRORS OPERATIONS
3919

```

|      |        |        |        |        |        |     |                    |                                    |
|------|--------|--------|--------|--------|--------|-----|--------------------|------------------------------------|
| 3920 | 013016 | 032764 | 000001 | 000056 | GETFNC | BIT | #SKDON, PRFLGS(R4) | . SEEK NEED TO BE VERIFIED?        |
| 3921 | 013024 | 001402 |        |        |        | BEQ | 15                 | . NO, CONTINUE                     |
| 3922 | 013026 | 000137 | 013650 |        |        | JMP | RDFNC              | . GO VERIFY SEEK                   |
| 3923 | 013032 | 005737 | 007532 |        | 15     | TST | T JRP              | . DROP ON ERROR LIMITS REACHED?    |
| 3924 | 013036 | 001456 |        |        |        | BEQ | 85                 | . NO                               |
| 3925 | 013040 | 026437 | 000012 | 007472 |        | CMP | ERRCNT(R4), ERLMT  | . HARD REACHED?                    |
| 3926 | 013046 | 103404 |        |        |        | BLO | 75                 |                                    |
| 3927 | 013050 | 012737 | 003111 | 002116 |        | MOV | #ERLMT, WHY        |                                    |
| 3928 | 013056 | 000442 |        |        |        | BR  | 115                |                                    |
| 3929 | 013060 | 026437 | 000014 | 007536 | 95     | CMP | SFTCNT(R4), SFLMT  | . SCFT REACHED?                    |
| 3930 | 013066 | 103404 |        |        |        | BLO | 105                |                                    |
| 3931 | 013070 | 012737 | 003154 | 002116 |        | MOV | #SFMSG, WHY        |                                    |
| 3932 | 013076 | 000432 |        |        |        | BR  | 115                |                                    |
| 3933 | 013100 | 026437 | 000074 | 007564 | 105    | CMP | DATCER(R4), T DCD  |                                    |
| 3934 | 013106 | 103404 |        |        |        | BLO | 1105               |                                    |
| 3935 | 013110 | 012737 | 003176 | 002116 |        | MOV | #DCMSG, WHY        |                                    |
| 3936 | 013116 | 000422 |        |        |        | BR  | 115                |                                    |
| 3937 | 013120 | 016401 | 000016 |        | 1105   | MOV | SKECNT(R4), R1     |                                    |
| 3938 | 013124 | 066401 | 000072 |        |        | ADD | TREPR(R4), P1      |                                    |
| 3939 | 013130 | 020137 | 007474 |        |        | CMP | R1, SELMT          |                                    |
| 3940 | 013134 | 103404 |        |        |        | BLO | 75                 |                                    |
| 3941 | 013136 | 012737 | 003133 | 002116 |        | MOV | #SERLMT, WHY       |                                    |
| 3942 | 013144 | 000407 |        |        |        | BR  | 115                |                                    |
| 3943 | 013146 | 026437 | 000020 | 007542 | 75     | CMP | DERCNT(P4), DRLMT  | . DRIVE ERROP REACHED?             |
| 3944 | 013154 | 103407 |        |        |        | BLO | 85                 |                                    |
| 3945 | 013156 | 012737 | 003221 | 002116 |        | MOV | #DERMSG, WHY       |                                    |
| 3946 | 013164 | 004537 | 020144 |        | 115    | JSP | P5, DRDRV          | . DROP THIS DRIVE!!!               |
| 3947 | 013170 | 000137 | 012510 |        |        | JMP | MAIN               | . GO GET ANOTHER                   |
| 3948 |        |        |        |        |        |     |                    |                                    |
| 3949 |        |        |        |        |        |     |                    |                                    |
| 3950 |        |        |        |        |        |     |                    |                                    |
| 3951 |        |        |        |        |        |     |                    |                                    |
| 3952 | 013174 | 005737 | 007540 |        | 55     | TST | T STA              | . DO WE WISH TO GRAB ON OPP LIMITS |
| 3953 | 013200 | 001422 |        |        |        | BEQ | 985                | . NO                               |
| 3954 |        |        |        |        |        |     |                    |                                    |
| 3955 | 013202 | 026437 | 000000 | 007500 |        | CMP | SKCNT(R4), SKLMT   | . PAST THE SEEK LIMIT??            |
| 3956 | 013210 | 103416 |        |        |        | BLO | 985                | . NO, THEN GO TEST                 |
| 3957 | 013212 | 016400 | 000060 |        |        | MOV | RXFR3(R4), R0      | . GET READ COUNT                   |
| 3958 | 013216 | 066400 | 000062 |        |        | ADD | WXFR3(R4), R0      | . ADD IN WRITE COUNT               |
| 3959 | 013222 | 020037 | 007476 |        |        | CMP | R0, DALMT          | . LIMIT REACHED??                  |
| 3960 | 013226 | 103407 |        |        |        | BLO | 985                | . NO, THEN GO TEST                 |
| 3961 | 013230 | 012737 | 003400 | 002116 |        | MOV | #SOPLMT, WHY       |                                    |
| 3962 | 013236 | 004537 | 020144 |        |        | JSP | P5, DRDRV          | . DROP THE DRIVE                   |
| 3963 | 013242 | 000137 | 012510 |        |        | JMP | MAIN               | . GO FOR ANOTHER DRIVE             |
| 3964 |        |        |        |        |        |     |                    |                                    |
| 3965 | 013246 | 004537 | 021140 |        | 985    | JSP | P5, PANC           | . GET FUNCTION, LEGAL FUNCTIONS    |
| 3966 |        |        |        |        |        |     |                    | . ARE 1 (WRITE CHECK)              |
| 3967 |        |        |        |        |        |     |                    | . 2 (GET STATUS)                   |
| 3968 |        |        |        |        |        |     |                    | . 3 (SEEK)                         |
| 3969 |        |        |        |        |        |     |                    | . 4 (RD HEADER)                    |
| 3970 |        |        |        |        |        |     |                    | . 5 (WRITE)                        |
| 3971 |        |        |        |        |        |     |                    | . 6 (READ)                         |
| 3972 |        |        |        |        |        |     |                    | . 0 & 7 ARE NOT LEGIT              |
| 3973 | 013252 | 013702 | 002126 |        |        | MOV | LONUM, P2          | . GET IT                           |
| 3974 | 013256 | 042702 | 177770 |        |        | BIC | #177770, P2        | . MASK TO 0-7                      |
| 3975 | 013262 | 001001 |        |        |        | BNE | 65                 | . IF 0, MAKE 1                     |

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3976 013264 005202          INC      R2
3977 013266 022702 000007    65      CMP      #7,R2      , IS IT 7?
3978 013272 001001          BNE     55      , IF 7, MAKE 6
3979 013274 005302          DEC     R2
3980 013276 006302          55     ASL     R2      , SHIFT LEFT (X2)
3981 013300 000172 017414    JMP     @LIST(R2)   , GO TO FUNCTION ROUTINE
3982
3983
3984          SBTTL  ROUTINE TO SETUP AND ISSUE GET STATUS
3985
3986          , WE GET HERE BY FALLING THRU "LIST" WITH A RANDOM FUNCTION OF 2
3987
3988 013304 012764 000004 000044  GSTFNC  MOV     #GSTAT,FUNC(R4) , LOAD GET STATUS
3989 013312 012764 000003 000040    MOV     #GSBIT,BDR(R4) , SET GSBIT IN COMMAND WORD
3990 013320 000137 014002          JMP     ISSUE      , GO ISSUE FUNCTION
3991
3992          SBTTL  ROUTINE TO SETUP AND ISSUE SEEK FUNCTION
3993
3994          , WE GET HERE BY FALLING THRU "LIST" WITH A RANDOM FUNCTION OF 3
3995          , WE WILL CALL "RAND" FOR A NEW DISK ADDRESS TO SEEK
3996          , TO ANY TRACK BUT LAST IS LEGAL WE WILL ALSO INCREMENT
3997          , IT'S SEEK COUNT
3998
3999 013324 005764 000114    SFUNC  TST     RSEEK(R4) , TRYING TO RECOVER
4000 013330 001411          BEQ     985      , NO, CONTINUE
4001 013332 016401 000050    MOV     LSTHDR(R4),R1 , YES SET UP FOR RESEEK
4002 013336 016402 000120    MOV     PRPOS(R4),R2  , TO CYLINDER
4003 013342 042701 000100    BIC     #100,R1      , HEAD SET IN LATEP
4004 013346 042702 000100    BIC     #100,R2
4005 013352 000507          BR      45      , SKIP RANDOM PART
4006 013354 004537 021140    985    JSR     R5,RAND    , GET A RANDOM NUMBER
4007 013360 013702 002126    MOV     LONUM,R2
4008 013364 043702 002132    BIC     SECMASK,R2   , LEAVE CYL AND HEAD
4009 013370 020264 000120    CMP     R2,PRPOS(R4) , ON THAT TRACK ALREADY
4010 013374 001002          BNE     905      , NO, CONTINUE
  
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|      |        |        |        |        |      |                       |   |
|------|--------|--------|--------|--------|------|-----------------------|---|
| 4012 | 013376 | 000137 | 013016 |        | JMP  | GETFNC                | , YES, DON'T RESEEK                               |
| 4013 | 013402 | 005003 |        | 905    | CLR  | R3                    |   |
| 4014 | 013404 | 010200 |        |        | MOV  | R2, R0                | , COPY  |
| 4015 | 013406 | 042700 | 177677 |        | BIC  | #177677, R0           | , LEAVE ONLY HEAD                                 |
| 4016 | 013412 | 023737 | 007520 | 007522 | CMP  | T MXC, T MNC          | , MIN AND MAX CYLINDERS THE SAME                  |
| 4017 | 013420 | 001003 |        |        | BNE  | 955                   | , NO, BRANCH AND STAY IN LIMITS                   |
| 4018 | 013422 | 013702 | 007520 |        | MOV  | T MXC, R2             | , MAKE CYLINDER MAX/MIN                           |
| 4019 | 013426 | 000430 |        |        | BR   | 925                   | , GC CLCULATE DIFF AND SEEK                       |
| 4020 | 013430 | 042702 | 000100 | 955    | BIC  | #HEAD, R2             | , STRIP OUT H S BIT                               |
| 4021 | 013434 | 023702 | 007520 | 945    | CMP  | T MXC, R0             | , IS ADDRESS LESS/EQUAL THAN MAX                  |
| 4022 | 013440 | 103010 |        |        | BHIS | 935                   | , YES, CHECK LOW END                              |
| 4023 | 013442 | 005203 |        |        | INC  | R3                    |   |
| 4024 | 013444 | 020327 | 000012 |        | CMP  | R3, #10               |   |
| 4025 | 013450 | 001741 |        |        | BEQ  | 985                   |   |
| 4026 | 013452 | 006202 |        |        | ASR  | R2                    | , HALF IT AND CHECK AGAIN                         |
| 4027 | 013454 | 062702 | 000200 | 915    | ADD  | #BIT7, R2             | , JUST TO MAKE NON ZERO                           |
| 4028 | 013460 | 000763 |        |        | BR   | 955                   | , GO BACK AND CHECK AGAIN                         |
| 4029 | 013462 | 023702 | 007522 | 935    | CMP  | T MNC P2              | , IS MIN GREATER/EQUAL THAN ADDRESS               |
| 4030 | 013466 | 101410 |        |        | BLOS | 925                   | , YES, CALCULATE DIFF AND SEEK                    |
| 4031 | 013470 | 005203 |        |        | INC  | R3                    |   |
| 4032 | 013472 | 020327 | 000012 |        | CMP  | R3, #10               |   |
| 4033 | 013476 | 001726 |        |        | BEQ  | 985                   |   |
| 4034 | 013500 | 006302 |        |        | ASL  | R2                    | , NO, DOUBLE IT                                   |
| 4035 | 013502 | 042702 | 100000 |        | BIC  | #BIT15, P2            | , BIT 15 CAN'T SET                                |
| 4036 | 013506 | 000762 |        |        | BR   | 915                   | , GO CHECK MAX/MIN AGAIN                          |
| 4037 | 013510 | 016401 | 000120 | 925    | MOV  | PRPOS(R4), R1         | , GET PRESENT DISK POSITION                       |
| 4038 | 013514 | 043701 | 002130 |        | BIC  | CYLMSK, R1            | , CLEAN OUT ITS SECTOR BITS                       |
| 4039 |        |        |        |        |      |                       |   |
| 4040 | 013520 | 016464 | 000120 | 0000EC | MOV  | PRPOS(R4), LSTHDR(R4) | , SAVE LAST                                       |
| 4041 | 013526 | 010264 | 000120 |        | MOV  | P2, PRPOS(R4)         | , NEW HEADER AFTER SEEK                           |
| 4042 | 013532 | 050064 | 000120 |        | BIS  | R0, PRPOS(R4)         | , SET IN RANDOM HEAD GOTTEN                       |
| 4043 | 013536 | 023737 | 007514 | 007516 | CMP  | T MXH, T MNH          | , MIN AND MAX HEAD SELECT THE SAME                |
| 4044 | 013544 | 001012 |        |        | BNE  | 965                   | , NO, THEN WE CAN USE BOTH SURFACES               |
| 4045 | 013546 | 005737 | 007514 |        | TST  | T MXH                 | , WHICH IS OUR SURFACE FOR USE                    |
| 4046 | 013552 | 001004 |        |        | BNE  | 975                   | , TOP SURFACE BRANCH                              |
| 4047 | 013554 | 042764 | 000100 | 000120 | BIC  | #HEAD, PRPOS(R4)      | , LOWER SURFACE ONLY                              |
| 4048 | 013562 | 000403 |        |        | BR   | 965                   |   |
| 4049 | 013564 | 052764 | 000100 | 000120 | 975  | BIS                   | #HEAD, PRPOS(R4)                                  |
| 4050 | 013572 |        |        | 965    |      |                       | , TOP SURFACE ONLY                                |
| 4051 |        |        |        |        |      |                       |   |
| 4052 |        |        |        |        |      |                       | CALCULATE THE DIFFERENCE WORD AND STORE IT IN BDA |
| 4053 |        |        |        |        |      |                       |   |
| 4054 |        |        |        |        |      |                       |   |
| 4055 | 013572 | 160102 |        | 45     | SUB  | P1 R2                 | , SUBTRACT PRESENT FROM NEXT                      |
| 4056 | 013574 | 100002 |        |        | BPL  | 15                    | , IF POSITIVE RESULT GO TO 15                     |
| 4057 | 013576 | 005402 |        |        | NEG  | P2                    | , NEG RESULT, NEGATE IT                           |
| 4058 | 013600 | 000402 |        |        | BR   | 25                    | , GO SET DIRECTION OUT                            |
| 4059 | 013602 | 052702 | 000004 | 15     | BIS  | #SIGN, R2             | , DIRECTION OUT, MARKER                           |
| 4060 | 013606 | 052702 | 000001 | 25     | BIS  | #MK, R2               | , MARKER BIT                                      |
| 4061 | 013612 | 032764 | 000100 | 000120 | BIT  | #HEAD, PRPOS(R4)      | , WHICH SURFACE SELECTED                          |
| 4062 | 013620 | 001402 |        |        | BEQ  | 35                    | , TOP, THEN 35                                    |
| 4063 | 013622 | 052702 | 000020 |        | BIS  | #SKHS, R2             | , BOTTOM SET HEAD BIT                             |
| 4064 | 013626 | 010264 | 000040 | 25     | MOV  | R2, BDA(R4)           | , MOVE DIFFERENCE WORD TO DA                      |
| 4065 | 013632 | 010264 | 000066 |        | MOV  | R2, DIFWD(R4)         | , LOAD DIFFERENCE WORD                            |
| 4066 | 013636 | 012764 | 000006 | 000144 | MOV  | #SEEK, FUNC(R4)       | , LOAD SEEK                                       |
| 4067 | 013644 | 000137 | 014002 |        | JMP  | ISSUE                 |   |

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4068
4069          SBTTL  ROUTINE TO LOAD READ HEADER AND ISSUE IT
4070
4071          ,WE GET HERE BY FALLING THRU "LIST" WITH A RANDOM FUNCTION OF 4
4072
4073
4074 013650 012764 000010 000044 RDHFNC  MOV    #RDHDR, FUNC(R4) ;LOAD READ HEADER
4075 013656 000137 014002          JMP    ISSUE
4076
4077          SBTTL  ROUTINE TO LOAD WRITE DATA COMMAND
4078
4079
4080 013662 022764 077700 000120 WRTFNC  CMP    #77700, PRPOS(R4) ,ON LAST TRACK?
4081 013670 001002          BNE    98$      ,NO, CONTINUE
4082 013672 000137 013324          JMP    SKFNC    ,YES, WE'LL SEEK OFF IT''
4083 013676 005737 007544          98$   TST    T ROF      ,READ ONLY
4084 013702 001402          BEQ    97$      ,NO
4085 013704 000137 013732          JMP    RDDFNC   ,YES
4086 013710 004537 022472          97$   JSR    R5, GWCDR ,GET WORD COUNT, DA
4087
4088          ,WE NOW HAVE SECTOR AND WORD COUNT, LET'S WRITE BUFFER IN MEMORY
4089          ,TO WRITE OUT TO DISK
4090          FORMAT      WORD 1 - # OF WORDS IN SECTOR
4091                   WORD 2 - ADDRESS OF PATTERN WRITTEN ON SECTOR
4092                   WORD 3 - 127 DATA PATTERN
4093
4094
4095 013714 004537 017154          JSR    R5, WRBUF ,WRITE BUFFER INTO MEMORY
4096 013720 012764 000012 000044 MOV    #WRITE, FUNC(R4) ,LOAD WRITE
4097 013726 000137 014002          JMP    ISSUE    ,GO ISSUE FUNCTION
4098
4099          SBTTL  ROUTINE TO LOAD READ DATA COMMAND
4100
4101          ,THIS ROUTINE WILL FIRST CLEAR OUT THE BUFFER AREA,
4102          ,SELECT A RANDOM NUMBER OF WORDS TO READ AND A
4103          ,RANDOM SECTOR ON THE PRESENT CYLINDER TO READ FROM
4104
4105 013732 022764 077700 000120 RDDFNC  CMP    #77700, PRPOS(R4) ,ON LAST TRACK?
4106 013740 001002          BNE    99$      ,NO CONTINUE
4107 013742 000137 013324          JMP    SKFNC    ,YES SEEK OFF IT
4108 013746 004537 022472          99$   JSR    R5, GWCDR ,GET WORD COUNT, DA
4109 013752 016402 000042          97$   MOV    BMP(R4), R2 ,CLEAR OUT BUFFER AREA
4110 013756 017401 000110          MOV    @BBA(P4), R1 ,SO WE KNOW REAL
4111 013762 005021          1$   CLR    (R1)+ ,WORKED''
4112 013764 005202          INC    R2
4113 013766 001375          BNE    1$
4114 013770 012764 000014 000044 MOV    #READ, FUNC(R4) ,LOAD READ
4115 013776 000137 014002          JMP    ISSUE
4116
4117          SBTTL  SETUP CONTROLLER AND DRIVE INFO FOR INTERRUPT PROCESSING
4118
4119          WE COME HERE BEFORE ISSUING ANY FUNCTION SO THAT ON INTERRUPT
4120          WE CAN PROPERLY PROCESS THE INTERRUPT WE WILL CHECK WHICH
4121          CONTROLLER WE ARE WORKING WITH AND STOPE OFF THE DRIVE BUFFER
4122          POINTER IN IT'S "LSTDR"
4123

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4124
4125 014002 026437 000104 002134 ISSUE CMP DCS(R4),CNTLR1 ;DRIVE ON CONTROLLER 1?
4126 014010 001003 BNE 15 ;NO, ASSUME ON CONTROLLER 2
4127 014012 010437 002140 MOV R4,LSTDR1 ;PUT BUFFER POINTER IN 1
4128 014016 000402 BR 25 ;SKIP OVER NEXT INSTRUCTION
4129 014020 010437 002142 15 MOV R4,LSTDR2 ;PUT BUFFER POINTER IN 2
4130 014024 052764 000100 000044 25 BIS #INTEN,FUNC(R4) ;ALLOW INTERRUPTS
4131 014032 004537 014042 JSR R5,LDFUNC ;NO WE ISSUE IT
4132 014036 000137 012510 JMP MAIN ;GO BACK AND DO ANOTHER
4133
4134
4135 SBTTL ROUTINE TO LOAD FUNCTION
4136
4137 ;CALL JSR P5,LDFUNC
4138 ;ALL INFORMATION MUST BE SET UP IN DRIVE BUFFER
4139 ;R4 HAS POINTER TO BUFFER
4140
4141 014042 016403 000104 LDFUNC MOV DCS(R4),R3 ;GET CSR FOR DRIVE
4142 014046 032713 000200 BIT #BIT7,(R3) ;CAN WE ISSUE COMMAND?
4143 014052 001003 BNE 15 ;YES, GO ISSUE COMMAND
4144
4145 014054 ERRSF 200 ,PRGER ;THIS ERROR SHOULD NEVER PRINT
(3) 014054 104421 TRAP T$ERCODE
(5) 014056 000310 WORD 200
(5) 014060 002521 WORD PRGER
4146
4147 014062 017463 000110 000002 15 MOV @BBA(R4),BA(R3) ;LOAD BUS ADDRESS REGISTER
4148 014070 016463 000040 000004 MOV BDA(R4),DA(R3) ;LOAD DISK ADDRESS REGISTER
4149 014076 016463 000042 000006 MOV BMP(R4),MP(R3) ;LOAD MULTI-PURPOSE REGISTER
4150 014104 016464 000044 000046 MOV FUNC(R4),BCSADR(R4) ;GET FUNCTION
4151 014112 056464 000106 000046 BIS DRSEL(R4),BCSADR(R4) ;SET DRIVE SELECT BITS
4152 014120 052764 000201 000046 BIS #CRDY'DRDY,BCSADR(R4) ;SET CRDY DRDY IN IMAGE
4153 014126 042764 002000 000046 BIC #OPI,BCSADR(R4) ;WE'RE CLEAR BIT 10 FOR DRIVE 7-4 (OKAY?)
4154 014134 016463 000046 000000 MOV BCSADR(R4),CS(R3) ;LOAD CSR
4155 014142 042763 000200 000000 BIC #CRDY,CS(R3) ;ISSUE FUNCTION
4156 014150 000205 RTS R5 ;EXIT
4157
4158 SBTTL INTERIPT SERVICE ROUTINES
4159
4160 014152 BGNSRV INTR1
4161
4162
4163 ON INTERRUPT WE CHECK FOR ERRORS FIRST. IF NO ERRORS WE
4164 CHECK FUNCTION PERFORMED WE ACT ACCORDING IF FUNCTION IS
4165 1- WRITE CHECK - NOTHING IF NO ERROR
4166 2- GET STATUS - READ AND CHECK DRIVE STATUS
4167 3- SEEK - NOTHING RTI, SET RD HDR AS NEXT COMMAND
4168 4- RDHDR - COMPARE HEADER TO PRESENT POSITION
4169 5- WRITE - UPDATE XFER COUNT, EXIT
4170 6- READ - COMPARE DATA IF REQUESTED, UPDATE XFER COUNT, EXIT
4171
4172 ALL SUCCESSFUL EXITS FROM INTERRUPT ROUTINE TEST PTRY
4173 LIMIT IF RETRY IS LESS THEN LIMIT THEN LOG SOFT EPPOR, CLEAR PTRY
4174 IF RETRY = 0, THEN NOTHING
4175
4176 ON ERRORS - IF DRIVE ERROR - UNDER NON-INTERIPT

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INTERRUPT SERVICE ROUTINES

SEQ 0064

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4177      /      DO      GET STATUS - INVESTIGATE ERROR TYPE
4178      /
4179      /      DO      DRIVE RESET - IF ERROR OCCURS AGAIN - FATAL ERROR
4180      /              IF NO ERROR, EXIT
4181      /      DRIVE ERROR IS LOGGED UNDER ALL CIRCUMSTANCES
4182      /
4183      /
4184      /      IF DCRC, HCRC, HNF CHECK BAD SECTOR LIST, IF IN LIST
4185      /      IGNORE ERROR EXIT AS NORMAL, IF NOT IN LIST
4186      /      INCREMENT RETRY, IF RETRY LIMIT EXCEEDED
4187      /      LOG HARD ERROR, ELSE RETRY FUNCTION
4188      /
4189      /      IF OPI,NXM INCREMENT RETRY CHECK RETRY LIMIT
4190      /      IF RETRY EXCEEDED LOG HARD ERROR EXIT
4191      /      IF RETRY NOT EXCEEDED RETRY FUNCTION
4192      /
4193      /
4194      /
4195 014152 010446      INTR1  MOV      R4,-(SP)      ,SAVE PRESENT R4 VALUE
4196 014154 013704 002140      MOV      LSTDR1,R4      ,GET THE DRIVE BUFFER OF INTERRUPTING DRIVE
4197 014160 000403      BR      SAVE      ,GO SAVE R0-R3
4198 014162 010446      INTR2  MOV      R4,-(SP)      ,SAVE PRESENT R4 VALUE
4199 014164 013704 002142      MOV      LSTDR2,R4      ,GET THE DRIVE BUFFER OF INTERRUPTING DRIVE
4200 014170 013746 002234      SAVE   MOV      E CS,-(SP)
4201 014174 013746 002236      MOV      E BA,-(SP)
4202 014200 013746 002240      MOV      E DA,-(SP)
4203 014204 013746 002242      MOV      E MP,-(SP)
4204 014210 013746 002244      MOV      E MP1,-(SP)
4205 014214 013746 002246      MOV      E MP2,-(SP)
4206 014220 013746 002156      MOV      CHKSEC,-(SP)
4207 014224 013746 002154      MOV      HDRFND,-(SP)
4208 014230 013746 002164      MOV      TEMP1,-(SP)
4209 014234 013746 002116      MOV      WHY,-(SP)
4210 014240 013746 002310      MOV      OPCALL,-(SP)
4211 014244 013746 002312      MOV      INCALL,-(SP)
4212 014250 010346      MOV      R3,-(SP)      ,SAVE R3
4213 014252 010246      MOV      R2,-(SP)      ,R2
4214 014254 010146      MOV      R1,-(SP)      ,R1
4215 014256 010046      MOV      R0,-(SP)      ,R0
4216 014260 016403 000104      MOV      DCS(R4),R3      ,GET CSP FOR INTERRUPT
4217 014264 016337 000000 002234      MOV      CS(R3),E CS      ,SAVE ALL REGISTERS NOW!!
4218 014272 016337 000002 002236      MOV      BA(R3),E BA
4219 014300 016337 000004 002240      MOV      DA(R3),E DA
4220 014306 016337 000006 002242      MOV      MP(R3),E MP
4221 014314 016337 000006 002244      MOV      MP(R3),E MP1
4222 014322 016337 000006 002246      MOV      MP(R3),E MP2
4223 014330 005737 002234      TST      E CS      ANY ERRORS?
4224 014334 100402      BMI      IS      ,YES, GO SOLVE ERROR MYSTERY
4225 014336 000137 015456      JMP      CHKENC      ,NO, GO SEE IF WE HAVE TO DO ANYTHING
4226
4227      SBTTL  CONTROLLER ERROR CHECK ROUTINE
4228
4229      ,WE HAVE SOME SORT OF ERROR LET'S FIND OUT WHICH ONE
4230      ,IT IS
4231
4232 014342 013764 002240 000064 19      MOV      E DA,LSTDA(R4) ,SAVE DA FOR SOFT ERROR PRINT

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4233 014350 032737 040000 002234      BIT      #DERR,E CS      ,DRIVE ERROR?
4234 014356 001402                      BEQ      2$          ;NO, CONTINUE
4235 014360 000137 016440                      JMP      CKDERR     ;YES, GO CHECK DRIVE ERROR
4236 014364 032737 000001 002234 2$    BIT      #DRDY,E CS      ;DRIVE READY THERE
4237 014372 001017                      BNE     23$        ;YES, CONTINUE CHECKING
4238 014374 004537 021046                      JSR     R5,GETDST  ;NO, GET DRIVE STATUS
4239 014400 042701 000100                      BIC     #100,R1    ;GET RID OF HEAD
4240 014404 020127 000034                      CMP     R1,#34     ;ALLOW ONLY SEEK TRACKING STATE
4241 014410 001410                      BEQ     23$        ;WAS 34 SKIP ERROR
4242
4243 014412 005264 000012      INC     ERRCNT(R4)  ;INDICATE HARD ERROR
4244 014416      ERROF  1000 ,NORDY,ERP9
      (3) 014416 104462      TRAP   T$ERCODE
      5  014420 001750      WORD   1000
      (5) 014422 002473      WORD   NORDY
      5  014424 005034      WORD   ERR9
4245
4246 014426 000137 016270      JMP     EXIT1
4247
4248 014432 032737 020000 002234 23$    BIT      #NXM,E CS      ,NON-EXISTANT MEMORY?
4249 014440 001407                      BEQ     3$          ;NO, KEEP CHECKING
4250 014442 012764 004137 000052      MOV     #MTNXM,R4)  ;ERROR MESSAGE
4251 014450 005264 000034      INC     NXMCNT(R4)  ;LOG ERROR
4252 014454 000137 015062      JMP     111$       ;CHECK RETRY, EXIT BACK
4253
4254 014460 032737 014000 002234 3$    BIT      #BIT12'BIT11,E CS  ,QUALIFING BITS SET?
4255 014466 001020                      BNE     5$          ;YES, CAN'T BE OPI ALONE
4256
4257 014470 032737 002000 002234      BIT      #OPI,E CS      ,OPI SET?
4258 014476 001006                      BNE     4$          ;YES, CONTINUE
4259
4260 014500      ERPSF  10 ,UDERR,ERR1  ;WE HAVE AN UNDIAGNOSABLE CONDITION, ONLY COMPOSITE SET
      (3) 014500 104461      TRAP   T$ERCODE
      (5) 014502 000012      WORD   10
      (5) 014504 002576      WORD   UDERR
      (5) 014506 004270      WORD   ERR1
4261 014510      33$    BREAK
      (3) 014510 104022      EMT    C$BRK
4262 014512 000776      BR     33$
4263
4264
4265 014514 012764 004132 000052 4$    MOV     #MTOPI,R4);SET UP FOR "OPI" PRINT
4266 014522 005264 000030      INC     OPICNT(R4)  ;LOG ERROR
4267 014526 000555      BP     111$       ;CHECK RETRY EXIT BACK
4268
4269      .WE KNOW IT'S NOW EITHER DLT, DCRC,HNF, OR HCRC
4270      CHECK FOR EACH
4271
4272 014530 032737 002000 002234 5$    BIT      #OPI,E CS      ,OPI QUALIFIER SET?
4273 014536 001060                      BNE     7$          ;YES, THEN IT'S HCRC OR HNF
4274
4275      IT'S NOW DOWN TO DLT OR DCRC
4276
4277 014540 032737 010000 002234      BIT      #DLT,E CS      ,DATA LATE?
4278 014546 001406                      BEQ     6$          ;NO, MUST BE DATA CRC
4279 014550 012764 004125 000052      MOV     #MTDLT,R4);SET UP FOR "DLT"PRINT
  
```

0  
D

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4280 014556 005264 000026      INC      DLT CNT(R4)      , LOG ERROR
4281 014562 000537              BR          111$      ; CHECK RETRY, EXIT
4282
4283 014564 013737 002240 002156 6$      MOV      E DA,CHKSEC    , SET UP SECTOR TO LOOK FOR
4284 014572 005364 000064              DEC      LSTDA(R4)      ; DOWN COUNT FOR PRINT OUT
4285 014576 005337 002156              DEC      CHKSEC         ; DOWN COUNT FOR LOOP UP
4286 014602 004537 023640              JSR      R5,CKBDSC     ; CHECK BAD SECTOR LIST
4287 014606 005737 002154              TST      HDRFND        , WAS HEADER THERE?
4288 014612 001115              BNE      110$         ; IGNORE ERROR, RETURN
4289 014614 005264 000022 117$      INC      DCRCR(R4)     ; ACCOUNT FOR ERROR
4290 014620 012764 004120 000052      MOV      #MTCRC,RTYPE(R4); SET UP FOR "DCRC" PRINT
4291 014626 022764 000102 000044      CMP      #INTEN'WRCHK, FUNC(R4)
4292 014634 001001              BNE      118$
4293 014636 000511              BR          111$
4294
4295 014640 005737 007530 118$      TST      T DCK        , DUMP BUFFER?
4296 014644 001506              BEQ      111$         , NO, EXIT
4297 014646              PRINTF    #FMT14, #DMPDCK
(8) 014646 012746 003054      MOV      #DMPDCK, -(SP)
(7) 014652 012746 006473      MOV      #FMT14, -(SP)
(6) 014656 012746 000002      MOV      #2, -(SP)
(3) 014662 010600      MOV      SP, R0
(4) 014664 104017      EMT      C$PNTF
(4) 014666 062706 000006      ADD      #6 SP
4298 014672 004537 023000      JSR      R5,DMPBUF    , DUMP BUFFER
4299
4300 014676 000471              BR          111$      , EXIT
4301
4302      , IT'S NOW EITHER HNF OR HCRC
4303      , IF HCRC AND RDHDR, DETERMINE IF BAD SECTOR BY DOING 40 RDHDRS
4304      , IF HCRC AND R/W, CHECK IF DA IS IN BAD SECTOR FILE
4305      , IF HNF READ HEADER TO VERIFY IF ON CORRECT CYLINDER
4306      , THEN IF ON CORRECT CYLINDER SEE IF DA IS A BAD SECTOR
4307      , IF NOT ON CORRECT CYLINDER REPORT MISSEK, LOG MISEEK
4308      , AND PRESENT POSITION UPDATE
4309
4310 014700 032737 010000 002234 7$      BIT      #HNF, E CS    , HEADER NOT FOUND SET?
4311 014706 001466              BEQ      112$         , NO IT MUST BE HCRC
4312 014710 012701 000051              MOV      #41, R1      , ALLOW FOURTY READ HEADERS TO
4313 014714 004537 021062 8$      JSR      R5,ISDRST
4314 014720 016402 000106              MOV      DRSEL(R4), R2 , FIND CYLINDER
4315 014724 052702 000010      BIS      #RDHDR, R2   ; READ HEADER
4316 014730 016403 000104      MOV      DCS(R4), R3
4317 014734 010263 000000      MOV      R2, CS(R3)   , ISSUE READ HEADER
4318 014740 004537 020776      JSR      R5,WTRDY     , WAIT
4319 014744 005301      DEC      R1           , DONE 40 OF THESE?
4320 014746 001422      BEQ      9$           , YES, GIVE UP WE DON'T HAVE ALL
4321 014750 005763 000000      TST      CS(P3)       , DAY, IS EROR SET?
4322 014754 100757      BMI      8$           , YES, GO DO IT AGAIN
4323
4324 014756 016301 000006      MOV      MP(R3), R1    , GET HEADER
4325 014762 043701 002132      BIC      SECMASK, R1   , MASK OUT SECTOR BITS
4326 014766 020164 000120      CMP      ?1, PRPOS(R4) , IS CYLINDER HEAD CORRECT?
4327 014772 001415      BEQ      ,0$         , YES, GO CHECK BAD SECTOR LIST
4328
4329

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4330 014774 005264 000072          INC      TRERR(R4)
4331 015000          ERRHRD  20 , TRACK, ERR2 , TRACKING DRIFT ERROR
      015000 104463          TRAP    T$ERCODE
      015002 000024          WORD    20
      015004 003074          WORD    TRACK
      015006 004276          WORD    ERR2
4332
4333
4334 015010 000137 015760          JMP     SKRETRY          , FIX TRACKING ERROR
4335
4336
4337 015014          95      ERRHRD  30 , EXHAUS, ERR1 , WE CAN'T FIND GOOD HEADER ON THIS TRACK
      015014 104463          TRAP    T$ERCODE
      015016 000036          WORD    30
      015020 002562          WORD    EXHAUS
      015022 004270          WORD    ERR1
4338
4339 015024 000410          BR      110$
4340
4341 015026 013737 002240 002156 10$      MOV     E, DA, CHKSEC
4342 015034 004537 023640          JSR     R5, CKBDSC      , GO CHECK BAD SECTOR FILE
4343 015040 005737 002154          TST     HDRFND          , WAS IT THERE
4344 015044 001401          BEQ     11$            , NO, LOG IT EXIT
4345 015046 000577          110$   BR      GOERRX      , YES IGNORE ERROR
4346
4347 015050 005264 000032          11$    INC     HNFERR(R4)      , LOG IT
4348 015054 012764 004105 000052          MOV     #MTHNF, RTYPE(P4), SET UP FOR "HNF" PPINT
4349 015062 000573          111$   BP      GOFIN       , EXIT
4350
4351
4352
4353          , IT WAS A HEADER CRC ERROR, FIGURE OUT IF IT WAS
4354          , ON A READ HEADER OR READ/WRITE
4355
4356
4357 015064 022764 000110 000044 112$   CMP     #INTENRDHDR, FUNC(R4) , READ HEADER?
4358 015072 001417          BEQ     13$            , YES, GO FIND OUT MORE ABOUT IT
4359          , NO, IT MUST BE R/W
4360 015074 013737 002240 002156          MOV     E, DA, CHKSEC
4361 015102 004537 023640          JSR     R5, CKBDSC      , BAD SECTOR SEARCH
4362 015106 005737 002154          TST     HDRFND          , WAS OUR DA THERE?
4363 015112 001401          BEQ     12$            , NO, MUST BE LEGIT ERROR
4364 015114 000554          BR      GOERRX      , YES, IGNORE ERROR
4365
4366 015116 005264 000024          12$    INC     HPCRER(R4)      , LOG ERROR
4367 015122 012764 004112 000052          MOV     #MTHCRC, RTYPE(R4)
4368 015130 000550          BP      GOFIN
4369
4370 015132 017401 000110          13$    MOV     @BBA(R4), R1      , USE IT'S BUFFER TO STORE HDPS
4371 015136 012737 000050 002164          MOV     #40, TEMP1      , 40 CONSECUTIVE HEADERS
4372 015144 012702 000010          14$    MOV     #RDHDR, R2      , READ HEADER
4373 015150 056402 000106          BIS     DRSEL(R4), R2
4374 015154 016403 000104          MOV     DCS(R4), R3
4375 015160 010263 000000          MOV     R2, CS(R3)
4376 015164 004537 020776          JSR     R5, WTRDY      , WAIT FOR READY
4377 015170 016321 000000          MOV     CS(R3), (R1)+   , READ ALL REGISTERS
  
```

```

4378 015174 016321 000006      MOV      MP(R3), (R1)+
4379 015200 016321 000006      MOV      MP(R3), (R1)+
4380 015204 016321 000006      MOV      MP(R3), (R1)+
4381 015210 005337 002164      DEC      TEMP1
4382 015214 001353      BNE      14$
4383
4384
4385
4386
4387
4388 015216 017402 000110      99$     MOV      @BBA(R4), R2
4389 015222 012701 000050      MOV      #40, R1
4390 015226 032712 002000      15$     BIT      #OPI, (R2)
4391 015232 001403      BEQ      16$
4392 015234 032712 004000      BIT      #HCRC, (R2)
4393 015240 001005      BNE      17$
4394 015242 062702 000010      16$     ADD      #10, R2
4395 015246 005301      DEC      R1
4396 015250 001366      BNE      15$
4397 015252 000721      BR       12$
4398
4399 015254 020274 000110      17$     CMP      R2, @BBA(R4)
4400 015260 001046      BNE      21$
4401
4402
4403
4404
4405 015262 017401 000110      MOV      @BBA(R4), R1
4406 015266 012703 000001      MOV      #1, R3
4407 015272 062701 000010      18$     ADD      #10, R1
4408 015276 032711 002000      BIT      #OPI, (R1)
4409 015302 001416      BEQ      19$
4410 015304 032711 004000      BIT      #HCRC, (R1)
4411 015310 001413      BEQ      19$
4412 015312 005203      INC      R3
4413 015314 022703 000017      CMP      #15, R3
4414 015320 001364      BNE      18$
4415
4416
4417 015322 012737 003457 002116      MOV      #MBDMSC, WHY
4418 015330 004537 020144      JSR      R5, DRDRV
4419 015334 000137 016270      JMP      EXIT1
4420
4421
4422 015340 005012      19$     CLR      (R2)
4423 015342 062701 000002      ADD      #2, R1
4424 015346 011102      MOV      (R1), R2
4425 015350 010201      MOV      R2, R1
4426 015352 042702 177700      BIC      #177700, R2
4427 015356 160301      SUB      R3, R1
4428 015360 100402      BMI     20$
4429 015362 160302      SUB      R3, R2
4430 015364 000421      BR       22$
4431 015366 160302      20$     SUB      R3, R2
4432 015370 062702 000050      ADD      #50, R2
4433 015374 000415      BR       22$

```

WE HAVE 40 HEADERS NOW LETS SEE IF WE CAN VERIFY WHETHER  
 OR NOT A BAD SECTOR CAUSED THE ERROR CHECK FIRST TO SEE  
 IF WE HAVE ANY BAD SECTORS ON THIS TRACK

GET BUFFER START  
 FOURTY HEADERS  
 IS OPI SET IN CS  
 NO, WELL CAN'T BE HCRC  
 INSURE HCRC W/OPI  
 FOUND GO SEE IF IT COMPARES  
 NEXT CS IMAGE  
 DONE 40

IS HEADER FIRST ONE?  
 NO, READ PREVIOUS HEADER  
 YES, WE'LL HAVE TO GO THRU  
 AND CHECK OTHERS BEFORE WE  
 CAN SAFELY CALCULATE  
 "SUPPOSED" BAD SECTOR

DROP DRIVE DUE TO  
 MORE THAN 16 BAD SECTORS

CLEAR THIS CS  
 GET IT'S HEADER ADDRESS  
 GET HEADER  
 SAVE HEADER  
 MASK ONLY SECTOR  
 BACK UP TO SECTOR WHICH IS BAD  
 IF MINUS DO MAGIC  
 NO THEN SUBTRACT IS LEGAL  
 BRANCH TO CHECK FILE  
 THIS SUB PRODUCES WRONG ANSWER  
 FIX IT UP  
 GO CHECK FILE

```

4434
4435 015376 005012          215 CLR (R2) ; CLEAR THIS CS OUT
4436 015400 162702 000006 SUB #6,R2 ; GET PREVIOUS HEADER
4437 015404 011201          MOV (R2), R1
4438 015406 005201          INC R1
4439 015410 010102          MOV R1,R2
4440 015412 042701 177700 BIC #177700,R1
4441 015416 022701 000050 CMP #40 ,R1
4442 015422 002402          BLT 225
4443 015424 162702 000050 SUB #40 ,R2
4444 015430 010237 002156 225 MOV R2,CHKSEC
4445 015434 004537 023640 JSR R5,CKBDS
4446 015440 005737 002154 TST HDRFND
4447 015444 001664          BEQ 995
4448 015446 000137 016274 GOERX JMP ERPREX
4449
4450
4451 015452 000137 016376 GOFIN JMP FINERR
4452
4453
4454
4455
4456
4457          SBTTL COMMAND SERVICE ROUTINES
4458
4459          THERE WAS NO ERROR SO
4460          NOW WE WILL FIND OUT WHICH FUNCTION WE DID TO CAUSE
4461          INTERRUPT AND ACT ACCORDINGLY
4462
4463
4464 015456 016401 000044 CHKENC MOV FUNC(R4),R1 ; GET FUNCTION OF DRIVE
4465 015462 006201          ASP R1 ; ALIGN THE FUNCTION CODE
4466 015464 042701 000040 BIC #40,R1 ; WIPE OUT INT ENAB (SHIFTED)
4467 015470 005301          DEC R1 ; WRITE CHECK??
4468 015472 001004          BNE 25 ; NO, BRANCH
4469 015474 004537 011366 JSR R5,CLRHLF
4470 015500 000137 016236 JMP EXIT
4471 015504 005301          25 DEC R1 ; GET STATUS?
4472 015506 001555          BEQ AGSTAT ; BRANCH IF SO
4473 015510 005301          DEC R1 ; SEEK?
4474 015512 001416          BEQ ASEEK ; BRANCH IF SO
4475 015514 005301          DEC R1 ; RDHDR?
4476 015516 001470          BEQ ARDHOP ; BRANCH IF SO
4477 015520 005301          DEC R1 ; WRITE?
4478 015522 001002          BNE 15 ; NO, BRANCH
4479 015524 000137 016146 JMP AWRITE
4480 015530 005301          15 DEC R1 ; READ?
4481 015532 001425          BEQ AFREAD ; BRANCH IF SO
4482
4483 015534          ERRSF 210 ,PRGER
(3) 015534 104421          TRAP TSERCODE
(5) 015536 000322          WORD 210
(5) 015540 002521          WORD PRGER
4484
4485 015542 000000          HALT
4486 015544 000137 016236 XEXIT JMP EXIT
  
```

```

4487
4488          SBTTL          SEEK
4489
4490 015550 052764 000001 000056 ASEEK  BIS  #SKDON,PRFLGS(R4) ;SET SEEK VERIFY NEEDED
4491 015556 005264 000054          INC  SKCNT1(R4) ;INCREMENT COUNT
4492 015562 026427 000054 001750          CMP  SKCNT1(R4),#1000 ;10(3) REACHED
4493 015570 002404          BLT  99$ ;NO, EXIT
4494 015572 005264 000000          INC  SKCNT(R4) ;YES, BUMP THOUSANDS
4495 015576 005064 000054          CLR  SKCNT1(R4)
4496 015602 000137 016274          99$  JMP  ERREX
4497
4498          SBTTL          READ
4499
4500 015606          AFREAD SETPRI #340
      (3) 015606 012700 000340          MOV  #340,R0
      (3) 015612 104041          EMT  C$SPR1
4501 015614 004537 020424          JSR  R5,CKDATA ;CHECK DATA
4502 015620          AFWRCK
4503 015620 016401 000042          1$  MOV  BMP(R4),R1 ;BUMP UP XFER COUNT
4504 015624 005401          NEG  R1 ;MAKE POSITIVE
4505 015626 060164 000002          ADD  R1,RXFR1(R4) ;ADD THE BITS
4506 015632 022764 023420 000002          CMP  #10000 ,RXFR1(R4) ;10(8) REACHED YET
4507 015640 101016          BHI  2$ ;NO, EXIT
4508 015642 005264 000004          INC  RXFR2(R4) ;BUMP 10(10)
4509 015646 162764 023420 000002          SUB  #10000 ,RXFR1(R4) ;START 10(8) AT 0
4510 015654 022764 023420 000004          CMP  #10000 ,RXFR2(R4) ;10(10) REACHED YET
4511 015662 101005          BHI  2$ ;NO, EXIT
4512 015664 005264 000060          INC  RXFR3(R4) ;YES BUMP 65K 10(10)
4513 015670 162764 023420 000004          SUB  #10000 ,RXFR2(R4) ;MAKE 10(10) 0
4514 015676 000557          2$  BR   EXIT ;EXIT
4515
4516          SBTTL          READ HEADER
4517
4518 015700 013701 002242          ARDHOP MOV  E MP,P1 ;GET HEADER
4519 015704 043701 002132          BIC  SECMASK,P1 ;MASK OUT SECTOR BITS
4520 015710 026401 000120          CMP  PRPOS(R4),P1 ;IS HEADER CORRECT?
4521 015714 001442          BEQ  1$ ;YES, CONTINUE
4522
4523 015716 032764 000001 000056          BIT  #SKDON PRFLGS(R4) ;IS THIS MIS-SEEK OR TRACKING ERROR
4524 015724 001407          BEQ  2$ BRANCH IF TRACKING
4525
4526 015726 005264 000016          INC  SKCNT(R4) ;ACCOUNT FOR SEEK ERROR
4527 015732          ERRHRD 50 ,MSKER,ERR2
      (3) 015732 104463          TRAP T$ERRCODE
      (5) 015734 000062          WORD 50
      (5) 015736 002620          WORD MSKER
      (5) 015740 004276          WORD ERR2
4528 015742 000406          BR   3$ ;BRANCH AROUND TRACKING ERROR REPORT
4529
4530 015744 005264 000072          2$  INC  TRERR(R4) ;ACCOUNT FOR TRACKING ERROR
4531 015750          ERRHRD 55 ,TRACK,ERR2 ;TRACKING ERROR
      (3) 015750 104463          TRAP T$ERRCODE
      (5) 015752 000067          WORD 55
      (5) 015754 003074          WORD TRACK
      (5) 015756 004276          WORD ERR2
4532
  
```

READ HEADER

```

4533          015760          SKRETRY=
4534
4535 015760 005264 000114          3$      INC      RSEEK(R4) , SET RETRY IN PROGRESS
4536 015764 026437 000114 007552      CMP      RSEEK(R4),T SLT ,RETRY EXHAUSTED????
4537 015772 101405          BLOS     4$              ;NO, THEN RETRY
4538
4539 015774          ERRHRD 333 , SEXHAU, ERR2
(3) 015774 104463      TRAP   TSERCODE
(5) 015776 000515          WORD   333
(5) 016000 003312          WORD   SEXHAU
(5) 016002 004276          WORD   ERR2
4540 016004 000406          BR     1$
4541
4542 016006 010164 000050          4$      MOV      R1,LSTHDR(R4) , SET UP RETRY
4543 016012 042764 000001 000056      BIC     #SKDON,PRFLGS(R4) , ALLOW SEEK
4544 016020 000506          BR     EXIT ,EXIT
4545 016022 042764 000001 000056 1$      BIC     #SKDON,PRFLGS(R4) , SET VERIFICATION DONE
4546 016030 005064 000114          CLP    PSEEK(P4)
4547 016034 010164 000120          MOV     R1,PRPOS(R4) , MAKE THIS HEADER PRESENT POSITION
4548 016040 000476          BR     EXIT ,EXIT
4549
4550          SBTTL          GET STATUS
4551
4552 016042 013701 002242          AGSTAT MOV     E MP, R1          , GET STATUS
4553 016046 042701 000100          BIC     #100, P1          CLEAR OUT HEAD SELECT
4554 016052 005737 007544          TST     T POF          READ ONLY
4555 016056 001402          BEQ     2$
4556 016060 042701 020000          BIC     #WL, R1
4557 016064 032701 177400          2$      BIT     #177400, R1          ANY BITS WRONG
4558 016070 001406          BEQ     1$              NO, CONTINUE
4559
4560 016072 005264 000012          INC     ERRCNT(R4)          STATUS BITS WRONG
4561 016076          EPPHRD 60 , MDSEP, EPP4
(3) 016076 104463      TRAP   TSERCODE
(5) 016100 000074          WORD   60
(5) 016102 002705          WORD   MDSEP
(5) 016104 004500          WORD   ERP4
4562
4563 016106 010102          1$      MOV     P1,P2          , COPY STATUS WORD
4564 016110 042702 177700          BIC     #177700 R2          GET STATE BITS
4565 016114 022702 000034          CMP     #34, R2          COVER CLSD, HEADS OUT, BPUSHES HOME, SEEK TRACK COUNTIN
4566 016120 001446          BEQ     EXIT          YES, EXIT
4567 016122 022702 000035          CMP     #35, R2          COVER CLSD HEADS OUT BPUSHES HOME, SEEK LINEAR MODE
4568 016126 001443          BEQ     EXIT          YES, EXIT
4569
4570 016130 005264 000012          INC     ERRCNT(R4)
4571 016134          EPPHRD 70 , MDSEP, EPP4
(3) 016134 104463      TRAP   TSERCODE
(5) 016136 000106          WORD   70
(5) 016140 002705          WORD   MDSEP
(5) 016142 004500          WORD   ERP4
4572
4573 016144 000434          BR     EXIT
4574
4575          SBTTL          WRITE
4576

```

WRITE

|      |        |        |        |        |        |         |                  |  |
|------|--------|--------|--------|--------|--------|---------|------------------|--|
| 4577 | 016146 | 016401 | 000042 |        | AWRITE | MOV     | BMP(R4),R1       | ,GET WORD COUNT                        |
| 4578 | 016152 | 005401 |        |        |        | NEG     | R1               | ,MAKE POSITIVE                         |
| 4579 | 016154 | 060164 | 000006 |        |        | ADD     | R1,WXFR1(R4)     | ,ADD THE BITS                          |
| 4580 | 016160 | 022764 | 023420 | 000006 |        | CMP     | #10000,WXFR1(R4) | ;10(5) YET?                            |
| 4581 | 016166 | 101023 |        |        |        | BHI     | EXIT             | ,NO, EXIT                              |
| 4582 | 016170 | 005264 | 000010 |        |        | INC     | WXFR2(R4)        | ,YES BUMP 10(10)                       |
| 4583 | 016174 | 162764 | 023420 | 000006 |        | SUB     | #10000,WXFR1(R4) | ,10(5) GOES TO ZERO                    |
| 4584 | 016202 | 022764 | 023420 | 000010 |        | CMP     | #10000,WXFR2(R4) | ;10(10) YET?                           |
| 4585 | 016210 | 101012 |        |        |        | BHI     | EXIT             | ;NO EXIT                               |
| 4586 | 016212 | 005264 | 000062 |        |        | INC     | WXFR3(R4)        | ;INC 65K (10)(10)                      |
| 4587 | 016216 | 162764 | 023420 | 000010 |        | SUB     | #10000,WXFR2(R4) | ;MAKE 10(10)                           |
| 4588 | 016224 | 005737 | 007562 |        |        | TST     | T WCK            | ;PERFORM WRITE CHECK                   |
| 4589 | 016230 | 001402 |        |        |        | BEQ     | EXIT             |  |
| 4590 | 016232 | 004537 | 011330 |        |        | JSR     | R5.SETWCK        |  |
| 4591 |        |        |        |        |        |         |                  |  |
| 4592 | 016236 | 005764 | 000036 |        | EXIT   | TST     | RETRY(R4)        | ,IN PROCESS OF RETRYING?               |
| 4593 | 016242 | 001414 |        |        |        | BEQ     | ERREX            | ,NO                                    |
| 4594 | 016244 | 026427 | 000052 | 004144 |        | CMP     | RTYPE(P4) #MTCRV |  |
| 4595 | 016252 | 001406 |        |        |        | BEQ     | EXIT1            |  |
| 4596 | 016254 | 005264 | 000014 |        |        | INC     | SFTCNT(P4)       | ,YES, LOG SOFT ERROR                   |
| 4597 |        |        |        |        |        |         |                  |  |
| 4598 | 016260 |        |        |        |        | ERRSOFT | 80,MSFER ERR3    | ,REPORT SOFT ERROR                     |
| (3)  | 016260 | 104464 |        |        |        | TRAP    | TSERCODE         |  |
| (5)  | 016262 | 000120 |        |        |        | WORD    | 80               |  |
| (5)  | 016264 | 002631 |        |        |        | WORD    | MSFER            |  |
| (5)  | 016266 | 004362 |        |        |        | WORD    | ERR3             |  |
| 4599 |        |        |        |        |        |         |                  |  |
| 4600 | 016270 | 005064 | 000036 |        | EXIT1  | CLR     | RETRY(R4)        | ,CLEAR RETRY                           |
| 4601 |        |        |        |        |        |         |                  |  |
| 4602 | 016274 | 042774 | 000100 | 000124 | ERREX  | BIC     | #INTEN. @DCS(R4) |  |
| 4603 | 016302 | 012600 |        |        |        | MOV     | (SP)+,P0         |  |
| 4604 | 016304 | 012601 |        |        |        | MOV     | (SP)+,R1         |  |
| 4605 | 016306 | 012602 |        |        |        | MOV     | (SP)+,P2         |  |
| 4606 | 016310 | 012603 |        |        |        | MOV     | (SP)+,P3         |  |
| 4607 | 016312 | 012637 | 002312 |        |        | MOV     | (SP)+,INCALL     |  |
| 4608 | 016316 | 012637 | 002310 |        |        | MOV     | (SP)+,OPCALL     |  |
| 4609 | 016322 | 012637 | 002116 |        |        | MOV     | (SP)+,WHY        |  |
| 4610 | 016326 | 012637 | 002164 |        |        | MOV     | (SP)+,TEMP1      |  |
| 4611 | 016332 | 012637 | 002154 |        |        | MOV     | (SP)+,HDRFND     |  |
| 4612 | 016336 | 012637 | 002156 |        |        | MOV     | (SP)+,CHKSEC     |  |
| 4613 | 016342 | 012637 | 002246 |        |        | MOV     | (SP)+,E MP2      |  |
| 4614 | 016346 | 012637 | 002244 |        |        | MOV     | (SP)+,E MP1      |  |
| 4615 | 016352 | 012637 | 002242 |        |        | MOV     | (SP)+,E MP       |  |
| 4616 | 016356 | 012637 | 002240 |        |        | MOV     | (SP)+,E DA       |  |
| 4617 | 016362 | 012637 | 002236 |        |        | MOV     | (SP)+,E BA       |  |
| 4618 | 016366 | 012637 | 002234 |        |        | MOV     | (SP)+,E CS       |  |
| 4619 | 016372 | 012604 |        |        |        | MOV     | (SP)+,R4         |  |
| 4620 | 016374 |        |        |        |        | ENDSPV  |                  |  |
| (3)  | 016374 |        |        |        | L10023 |         |                  |  |
| (2)  | 016374 | 000002 |        |        |        | RTI     |                  |  |
| 4621 |        |        |        |        |        |         |                  |  |
| 4622 | 016376 | 004537 | 017374 |        | FINERR | JSR     | R5,PCNT          | ,CHECK TO SEE IF WE HAVE EXCEEDED      |
| 4623 | 016402 | 000405 |        |        |        | BR      | 15               | ,RETRY LIMIT. IF SC IS AND REPORT HARD |
| 4624 | 016404 | 013764 | 002234 | 000116 |        | MOV     | E CS,SOFTCS(R4)  |  |
| 4625 | 016412 | 000137 | 016274 |        |        | JMP     | ERREX            | ,NOT EXCEEDED EXIT                     |
| 4626 | 016416 | 005264 | 000012 |        | 15     | INC     | ERRCNT(R4)       | ,INDICATE ERROR                        |

WRITE

SEQ 0073

```

4627
4628 016422          ERRHRD 90 ,MHDER,ERR1 ,NON-RECOVERABLE ERROR
      (3) 016422 104463 TRAP   TSERCODE
      (5) 016424 000132 WORD   90
      (5) 016426 003041 WORD   MHDER
      (5) 016430 004270 WORD   ERR1
4629 016432 004537 011366 JSR    R5,CLRWCK
4630
4631 016436 000714          BR     EXIT1
4632
4633          SBTTL  DRIVE ERROR SERVICE
4634
4635          .WE HAVE A DRIVE ERROR. LET'S GET THE STATUS
4636
4637 016440 005264 000020 CKDEPR INC     DERCNT(R4) ,ACCOUNT FOR ERROR
4638 016444 004537 021046 JSR    R5,GETDST ,GET DRIVE STATUS
4639
4640          .REPOFT DRIVE ERROR
4641 016450          ERRHRD 224 ,DRVER,ERR9 ,DRIVE ERROR
      (3) 016450 104463 TRAP   TSERCODE
      (5) 016452 000340 WORD   224
      (5) 016454 002650 WORD   DRVER
      (5) 016456 005024 WORD   ERR9
4642
4643          .ACT ACCORDINGLY TO DRIVE EPROR
4644 016460 032701 021000 BIT    #VC,R1 ,VOLUME CHECK?
4645 016464 001027 BNE   95 ,YES, GO ISSUE RESET
4646 016466 032701 010000 BIT    #SKTO,R1 ,SEEK TIME OUT?
4647 016472 001070 BNE   125 ,YES, ISSUE RESET
4648 016474 032701 144000 BIT    #WDE'HC'E'SPE,R1 ,WRITE DATA, CURRENT HEAD, SPINDLE?
4649 016500 001130 BNE   155 ,GO WAIT FOR HEADS TO UNLOAD
4650 016502 032701 002000 BIT    #WGE,R1 ,WRITE GATE ERROR
4651 016506 001003 BNE   205 ,YES, ISSUE RESET
4652 016510 004537 021062 JSR    R5,ISDRST ,ISSUE RESET
4653 016514 000431 BR     105 ,GO CHECK DRIVE READY
4654 016516 004537 021062 205 JSP   R5,ISDRST ,ISSUE RESET
4655 016522 004537 021046 JSR    R5,GETDST ,RESET WORK?
4656 016526 032701 002000 BIT    #WGE,R1 ,WGE CLEAR
4657 016532 001422 BEQ   105 ,YES GO CHECK DRIVE READY
4658 016534 012737 002746 002116 MOV    #WGEST,WHY ,REPOFT WGE DIDN'T CLP
4659 016542 000412 BR     915 ,DROP DRIVE
4660
4661 016544 004537 021062 95 JSP   R5,ISDRST ,ISSUE RESET
4662 016550 004537 021046 JSP   R5,GETDST ,RESET WORK
4663 016554 032701 001000 BIT    #VC,R1 ,VOL CHK CLEAR
4664 016560 001407 BEQ   105 ,YES, CHECK DRIVE READY
4665 016562 012737 002721 002116 MOV    #MVCER,WHY ,DROP THE DRIVE
4666
4667 016570 004537 020144 915 JSP   P5,DRDRV
4668 016574 000137 016270 JMP   EXIT1
4669 016600 032763 000001 000000 105 BIT    #DRDY,CS(R3) ,DRIVE READY POSTED?
4670 016606 001004 BNE   1015 ,YES, PRINT RECOVERED
4671
4672 016610 012737 002460 002116 MOV    #DNRDY,WHY
4673 016616 000764 BR     915 ,NO. DROP DRIVE
4674

```

|      |        |        |        |        |      |        |                |                                 |
|------|--------|--------|--------|--------|------|--------|----------------|---------------------------------|
| 4675 | 016620 |        |        |        | 1015 | PRINTB | #FMT14, #MRDER | .PRINT DRIVE RECOVERED          |
| (8)  | 016620 | 012746 | 003001 |        |      | MOV    | #MRDER, -(SP)  |                                 |
| (7)  | 016624 | 012746 | 006473 |        |      | MOV    | #FMT14, -(SP)  |                                 |
| (6)  | 016630 | 012746 | 000002 |        |      | MOV    | #2, -(SP)      |                                 |
| (3)  | 016634 | 010600 |        |        |      | MOV    | SP, R0         |                                 |
| (4)  | 016636 | 104014 |        |        |      | EMT    | C\$PNTB        |                                 |
| (4)  | 016640 | 062706 | 000006 |        |      | ADD    | #6, SP         |                                 |
| 4676 | 016644 | 004537 | 017102 |        |      | JSR    | R5, GHDR       |                                 |
| 4677 | 016650 | 000137 | 016376 |        |      | JMP    | FINERR         |                                 |
| 4678 | 016654 | 012702 | 000004 |        | 125  | MOV    | #4, R2         | .SEEK TIME OUT                  |
| 4679 | 016660 | 004537 | 021062 |        | 135  | JSR    | R5, ISDRST     | .ISSUE DRIVE RESET              |
| 4680 |        |        |        |        |      |        |                | .FOUR TIMES BEFORE              |
| 4681 | 016664 |        |        |        |      | WAITUS | #15000         | .DROPPING DRIVE                 |
| (3)  | 016664 | 012700 | 035230 |        |      | MOV    | #15000, R0     |                                 |
| (3)  | 016670 | 104027 |        |        |      | EMT    | C\$WTU         |                                 |
| 4682 |        |        |        |        |      |        |                |                                 |
| 4683 | 016672 | 032763 | 000001 | 000000 |      | BIT    | #DRDY, CS(R3)  | .DRIVE READY YET?               |
| 4684 | 016700 | 001006 |        |        |      | BNE    | 145            | .YES, CHECK IF ERROR CLEARED    |
| 4685 | 016702 | 005302 |        |        |      | DEC    | R2             | .NO, HAVE WE DONE IT FOUR TIMES |
| 4686 | 016704 | 001365 |        |        |      | BNE    | 135            | .YET                            |
| 4687 |        |        |        |        |      |        |                |                                 |
| 4688 | 016706 | 012737 | 002657 | 002116 | 1415 | MOV    | #MDERS, WHY    | .YES, DROP DRIVE                |
| 4689 | 016714 | 000725 |        |        |      | BR     | 915            |                                 |
| 4690 |        |        |        |        |      |        |                |                                 |
| 4691 | 016716 | 032763 | 040000 | 000000 | 145  | BIT    | #DEPR, CS(R3)  | .DRIVE ERROR SET STILL          |
| 4692 | 016724 | 001370 |        |        |      | BNE    | 1415           | .YES, DROP DRIVE                |
| 4693 | 016726 |        |        |        |      | PRINTB | #FMT14, #MPDER |                                 |
| (8)  | 016726 | 012746 | 003001 |        |      | MOV    | #MRDER, -(SP)  |                                 |
| (7)  | 016732 | 012746 | 006473 |        |      | MOV    | #FMT14, -(SP)  |                                 |
| (6)  | 016736 | 012746 | 000002 |        |      | MOV    | #2, -(SP)      |                                 |
| (3)  | 016742 | 010600 |        |        |      | MOV    | SP, R0         |                                 |
| (4)  | 016744 | 104014 |        |        |      | EMT    | C\$PNTB        |                                 |
| (4)  | 016746 | 062706 | 000006 |        |      | ADD    | #6, SP         |                                 |
| 4694 | 016752 | 004537 | 017102 |        |      | JSR    | R5, GHDR       |                                 |
| 4695 | 016756 | 000137 | 016236 |        |      | JMP    | EXIT           |                                 |
| 4696 |        |        |        |        |      |        |                |                                 |
| 4697 | 016762 | 012702 | 000004 |        | 155  | MOV    | #4, R2         | .WAIT FOR HEADS TO UNLOAD       |
| 4698 | 016766 | 004537 | 021046 |        | 165  | JSR    | R5, GETDST     | .GET STATUS                     |
| 4699 | 016772 | 032701 | 000020 |        |      | BIT    | #BIT4, R1      | .UNLOAD STATE                   |
| 4700 | 016776 | 001411 |        |        |      | BEQ    | 175            | .YES, CONTINUE W/ RECOVERY      |
| 4701 | 017000 |        |        |        |      | WAITMS | #1             | .WAIT A WHILE                   |
| (3)  | 017000 | 012700 | 000001 |        |      | MOV    | #1, R0         |                                 |
| (3)  | 017004 | 104026 |        |        |      | EMT    | C\$WTM         |                                 |
| 4702 | 017006 | 005302 |        |        |      | DEC    | R2             | .WAIT LONG ENOUGH               |
| 4703 | 017010 | 001366 |        |        |      | BNE    | 165            | .NO, GO BACK                    |
| 4704 | 017012 | 012737 | 003336 | 002116 |      | MOV    | #UNLOAD, WHY   | .DROP DRIVE                     |
| 4705 | 017020 | 000663 |        |        |      | BR     | 915            |                                 |
| 4706 |        |        |        |        |      |        |                |                                 |
| 4707 | 017022 | 004537 | 021062 |        | 175  | JSR    | R5, ISDRST     | .ISSUE RESET                    |
| 4708 | 017026 |        |        |        |      | WAITMS | #1             |                                 |
| (3)  | 017026 | 012700 | 000001 |        |      | MOV    | #1, R0         |                                 |
| (3)  | 017032 | 104026 |        |        |      | EMT    | C\$WTM         |                                 |
| 4709 | 017034 | 032763 | 040000 | 000000 |      | BIT    | #DERR, CS(R3)  | .DRIVE ERROR CLEAR?             |
| 4710 | 017042 | 001321 |        |        |      | BNE    | 1415           | .NO, DROP DRIVE                 |
| 4711 | 017044 | 012702 | 000075 |        |      | MOV    | #61, R2        | .YES, WAIT 60 SECONDS           |
| 4712 | 017050 |        |        |        | 185  | WAITMS | #10            | .FOR DRIVE READY TO             |

```

(3) 017050 012700 000012      MOV      #10, R0
(3) 017054 104026      EMT      CSWTH
4713 017056 032763 000001 000000  BIT      #DRDY, CS(R3) ; COME BACK
4714 017064 001314      BNE      14$
4715 017066 005302      DEC      R2
4716 017070 001367      BNE      18$
4717 017072 012737 003362 002116  MOV      #NOLOAD, WHY ; NO READY DROP DRIVE
4718 017100 000633      BR       91$
4719
4720
4721 017102 012763 000210 000000  GHDR    MOV      #CRDY|RDHDR, CS(R3)
4722 017110 056463 000106 000000  BIS      DRSEL(R4), CS(R3)
4723 017116 042763 000200 000000  BIC      #200, CS(R3)
4724 017124 004537 020776      JSR      R5, WTRDY
4725 017130 016301 000006      MOV      MP(R3), R1
4726 017134 043701 002132      BIC      SECMSK, R1
4727 017140 010164 000120      MOV      R1, PRPOS(R4)
4728 017144 012764 004144 000052  MOV      #MTRV, RTYPE(R4) ; SETUP DRIVE ERROR
4729 017152 000205      RTS      R5
4730
4731      .ROUTINE TO WRITE A BUFFER INTO MEMORY  USES WORD COUNT AND BUS
4732      .ADDRESS FROM DRIVE BUFFER (R4)  WILL WRITE RANDOM FROM ONE OF
4733      .8 PATTERNS  USED BY WRITE FUNCTION AND WRPACK ROUTINE
4734
4735 017154 010346      WRBUF   MOV      R3, -(SP)      .SAVE REGISTERS
4736 017156 010246      MOV      R2, -(SP)
4737 017160 010146      MOV      R1, -(SP)
4738 017162 010046      MOV      R0, -(SP)
4739 017164 016402 000042      MOV      BMP(R4), R2      .R2 HAS TOTAL WORDS TO SET UP FOR
4740 017170 005402      NEG      P2              .POSITIVE NUMBER
4741 017172 017401 000110      MOV      @BBA(R4), R1    .WHERE BUFFER IS
4742 017176 020227 000200 2$      CMP      R2, #128      .MORE THAN 128 WORDS
4743 017202 002015      BGE      4$              .YES, BRANCH
4744 017204 020227 000003      CMP      R2, #3         .GREATER THAN THREE WORDS
4745 017210 002005      BGE      3$              .YES, BRANCH
4746 017212 062702 000003      ADD      #3, R2          .ADD 3
4747 017216 162764 000003 000042  SUB      #3, BMP(R4)     .WC UP BY 3
4748 017224 010221 3$      MOV      R2, (R1)+      .STORE WC
4749 017226 005302      DEC      R2              .ACCOUNT FOR WC
4750 017230 010237 002176      MOV      R2, TEMP6      .LOAD DOWN COUNTER
4751 017234 000405      BR       5$
4752 017236 012737 000177 002176 4$      MOV      #127, TEMP6    .LOAD DOWN COUNTER
4753 017244 012721 000200      MOV      #128, (R1)+
4754 017250 005737 007546 5$      TST      T RAN          .RANDOM SELECT OF PATTERNS
4755 017254 001003      BNE      55$            .YEA
4756 017256 013703 007550      MOV      T PAT, R3      .NO GET PATTERN OPERATOR
4757 017262 000406      BR       56$            .WANTS TO USE
4758 017264 004537 021140 55$      JSR      R5, RAND       .GET RANDOM # FOR PATTERN
4759 017270 013703 002126      MOV      LONUM, R3      .GET RANDOM PATTERN
4760 017274 042703 177770      BIC      #177770, P3    .0, 7
4761 017300 006303 56$      ASL      R3              .WORD OFFSET
4762 017302 062703 024324      ADD      #PATLST, R3    .GET PATTERN LIST
4763 017306 011303      MOV      (R3), R3       .GET LIST ADDRESS
4764 017310 010337 002200      MOV      R3, TEMP7      .STOR FOR RECALL
4765 017314 010321      MOV      R3, (R1)+      .LOAD IT
4766 017316 005337 002176      DEC      TEMP6          .ACCOUNT FOR IT
  
```

```

4767 017322 013703 002200 6% MOV TEMP7,R3 ,PATTERN START
4768 017326 012737 000020 002202 MOV #16 ,TEMP8 ,16 ENTRIES
4769 017334 012321 7% MOV (R3)+,(R1)+ ,STORE PATTERN
4770 017336 005337 002176 DEC TEMP6 ;DOWN COUNT
4771 017342 001404 BEQ 8% ;DONE?
4772 017344 005337 002202 DEC TEMP8 ;DONE WITH PATTERN
4773 017350 001371 BNE 7% ;NO, GO BACK
4774 017352 000763 BR 6% ;RESTART PATTERN
4775 017354 162702 000200 8% SUB #128 ,R2 ,ANOTHER SECTOR TO USE
4776 017360 003306 BGT 2% ;YES GO BACK
4777 017362 012600 MOV (SP)+,R0 ,RESTORE REGISTERS
4778 017364 012601 MOV (SP)+,R1
4779 017366 012602 MOV (SP)+,R2
4780 017370 012603 MOV (SP)+,R3
4781 017372 000205 RTS R5
  
```

SBTTL RETRY LIMIT ROUTINE

.RETRY BUMP, TWO RETURNS - CALL +2 - PENTRY EXCEEDED  
 CALL +4 - CONTINUE RETRY

```

4788 017374 026437 000036 007470 PCNT CMP RETRY(R4),LIMIT ,LIMIT REACHED?
4789 017402 001403 BEQ 1% ;YES TAKE FIRST RETURN
4790 017404 005264 000036 INC RETRY(R4) ,ACCOUNT FOR RETRY
4791 017410 005725 TST (R5)+ ,NEXT RETURN
4792 017412 000205 1% RTS R5 ,RETURN
  
```

SBTTL LIST OF FUNCTION ROUTINES

.WE GO THRU THIS LIST WHEN CALLED IN "GETFNC"  
 LIST IS IN NUMERICAL ORDER 1-6 (CONTROLLER RESET - READ)

```

4799 017414 000000 LIST WORD 0
4800 017416 013662 WRTFNC ,WRITE DATA
4801 017420 013304 GSTFNC ,GET STATUS
4802 017422 013324 SKFNC ,SEEK FUNCTION
4803 017424 013324 SRFNC ,SEEK FUNCTION
4804 017426 013662 WRTFNC ,WRITE DATA
4805 017430 013732 RDDFNC ,READ DATA
  
```

SBTTL BAD SECTOR FILE ROUTINE

ROUTINE TO RECOVER BAD SECTOR FILE AND SAVE IT FOR  
 COMPARISON UPON ERROR ON READS/WRITES WE WILL ONLY  
 RESERVE SPACE FOR 16 BAD SECTORS PER DRIVE  
 WE WILL ISSUE A DRIVE RESET FIRST, READ HEADER, POSITION  
 TO LAST TRACK (CYLINDER 255, SURFACE 1) AND READ IN  
 THE FIRST SECTOR FOR FACTORY BAD, AND THE 20TH FOR  
 FIELD BAD SECTORS R4 WILL CONTAIN THE BUFFER POINTER  
 TO THE DRIVE WE WANT TO READ

```

4818 CALL JSR R5,R0BDSC
4821 017432 010046 R0BDSC MOV R0,-(SP) ,SAVE REGISTER
4822 017434 010146 MOV R1,-(SP)
  
```

|      |        |        |        |        |     |                        |                                   |                               |
|------|--------|--------|--------|--------|-----|------------------------|-----------------------------------|-------------------------------|
| 4823 | 017436 | 010246 |        |        | MOV | R2, -(SP)              |                                   |                               |
| 4824 | 017440 | 010346 |        |        | MOV | R3, -(SP)              |                                   |                               |
| 4825 | 017442 | 004537 | 021062 |        | JSR | R5, ISDRST             |                                   |                               |
| 4826 | 017446 | 012764 | 000010 | 000044 | MOV | #RDHDR, FUNC (R4),     | READ HEADER TO FIND POSITION      |                               |
| 4827 | 017454 | 004537 | 014042 |        | JSR | R5, LDFUNC             | ; ON DISK                         |                               |
| 4828 | 017460 | 004537 | 020776 |        | JSR | R5, WTRDY              |                                   |                               |
| 4829 |        |        |        |        |     |                        |                                   |                               |
| 4830 | 017464 | 016300 | 000006 |        | MOV | MP(R3), R0             | ; GET HEADER AND CALCULATE        |                               |
| 4831 | 017470 | 043700 | 002130 |        | BIC | CYLSK, R0              | ; DIFFERENCE TO GET TO            |                               |
| 4832 | 017474 | 012701 | 077600 |        | MOV | #77600, R1             | ; BAD SECTOR FILE, AND GO         |                               |
| 4833 | 017500 | 160001 |        |        | SUB | R0, R1                 | ; THERE                           |                               |
| 4834 | 017502 | 010164 | 000040 |        | MOV | R1, BDA(R4)            |                                   |                               |
| 4835 | 017506 | 052764 | 000025 | 000040 | BIS | #SKHS!SIGN!MK, BDA(R4) |                                   |                               |
| 4836 | 017514 | 012764 | 000006 | 000044 | MOV | #SEEK, FUNC(R4)        |                                   |                               |
| 4837 | 017522 | 004537 | 014042 |        | JSR | R5, LDFUNC             |                                   |                               |
| 4838 | 017526 | 004537 | 020776 |        | JSR | R5, WTRDY              |                                   |                               |
| 4839 | 017532 | 012764 | 000010 | 000044 | MOV | #RDHDR, FUNC(R4)       |                                   |                               |
| 4840 | 017540 | 004537 | 014042 |        | JSR | R5, LDFUNC             |                                   |                               |
| 4841 | 017544 | 004537 | 020776 |        | JSR | R5, WTRDY              |                                   |                               |
| 4842 | 017550 | 016300 | 000006 |        | MOV | MP(R3), R0             |                                   |                               |
| 4843 | 017554 | 042700 | 000077 |        | BIC | #77, R0                |                                   |                               |
| 4844 | 017560 | 022700 | 077700 |        | CMP | #7700, R0              |                                   |                               |
| 4845 | 017564 | 001326 |        |        | BNE | 215                    |                                   |                               |
| 4846 |        |        |        |        |     |                        |                                   |                               |
| 4847 | 017566 | 012764 | 077700 | 000040 | MOV | #77700, BDA(R4)        | ; SETUP AND READ IN THE           |                               |
| 4848 | 017574 | 012764 | 177400 | 000042 | MOV | #-256, BMP(R4)         | ; BAD SECTOR FILE ON SECTOR       |                               |
| 4849 | 017602 | 012764 | 000014 | 000044 | MOV | #READ, FUNC(R4)        | ; 0                               |                               |
| 4850 |        |        |        |        |     |                        |                                   |                               |
| 4851 | 017610 | 005037 | 002170 |        | CLR | TEMP3                  | ; MANUFACTURING/FIELD FILE SWITCH |                               |
| 4852 | 017614 | 012737 | 003510 | 002116 | MOV | #HWSEC, WHY            | ; START WITH MANUFACTURING BAD    |                               |
| 4853 | 017622 | 016402 | 000112 |        | MOV | BSECT(R4), R2          | ; INITIALIZE LIST TO ALL 1'S      |                               |
| 4854 | 017626 | 012700 | 000020 |        | MOV | #16, R0                | ; SIXTEEN ENTRIES                 |                               |
| 4855 | 017632 | 012722 | 177777 |        | MOV | #-1, (R2)+             |                                   |                               |
| 4856 | 017636 | 005300 |        |        | DEC | R0                     |                                   |                               |
| 4857 | 017640 | 001374 |        |        | BNE | 115                    |                                   |                               |
| 4858 |        |        |        |        |     |                        |                                   |                               |
| 4859 | 017642 | 016402 | 000112 |        | MOV | BSECT(R4), R2          | ; GET LIST TO STORE               |                               |
| 4860 | 017646 | 012700 | 000020 |        | MOV | #16, R0                | ; SIXTEEN ENTRIES                 |                               |
| 4861 | 017652 | 004537 | 014042 |        | JSR | R5, LDFUNC             |                                   |                               |
| 4862 | 017656 | 004537 | 020776 |        | JSR | R5, WTRDY              |                                   |                               |
| 4863 |        |        |        |        |     |                        |                                   |                               |
| 4864 | 017662 | 005774 | 000104 |        | TST | BDCS(R4)               | ; WAS THE READ GOOD?              |                               |
| 4865 | 017666 | 100025 |        |        | BPL | 35                     | ; YES                             |                               |
| 4866 |        |        |        |        |     |                        |                                   |                               |
| 4867 | 017670 | 004537 | 021062 |        | JSR | R5, ISDRST             |                                   |                               |
| 4868 | 017674 | 062764 | 000004 | 000040 | ADD | #4, BDA(R4)            | ; NO, NEXT SECTOR                 |                               |
| 4869 | 017702 | 005737 | 002170 |        | TST | TEMP3                  | ; MANUFACTURING OR FIELD BAD      |                               |
| 4870 | 017706 | 001410 |        |        | BEQ | 55                     | ; MANUFACTURING                   |                               |
| 4871 | 017710 | 012737 | 003530 | 002116 | MOV | #SWSEC, WHY            | ; FIELD BAD                       |                               |
| 4872 | 017716 | 022764 | 077750 | 000040 | CMP | #77750, BDA(R4)        | ; AT END OF FIELD BAD?            |                               |
| 4873 | 017724 | 001352 |        |        | BNE | 45                     | ; NO, GO BACK FOR NEXT            |                               |
| 4874 | 017726 | 000470 |        |        | BR  | 65                     |                                   |                               |
| 4875 | 017730 | 026427 | 000040 | 077724 | 55  | CMP                    | BDA(R4), #77724                   | ; AT END OF MANUFACTURING BAD |
| 4876 | 017736 | 001345 |        |        | BNE | 45                     | ; AT END OF BAD FACTORY SECTION   |                               |
| 4877 | 017740 | 000463 |        |        | BR  | 65                     | ; YES, REPORT ERROR               |                               |
| 4878 |        |        |        |        |     |                        |                                   |                               |

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4879 017742 017401 000110      3$  MOV      @BBA(R4),R1      ; START OF LIST
4880 017746 012164 000100      MOV      (R1)+,SERNM1(R4) ; GET LOW PART OF SERIAL #
4881 017752 012164 000102      MOV      (R1)+,SERNM2(R4) ; GET HIGH PART OF SERIAL #
4882 017756 022121      CMP      (R1)+,(R1)+      ; SKIP PAST JUNK
4883 017760 012137 002164      1$  MOV      (R1)+,TEMP1      ; GET CYLINDER
4884 017764 100437      BMI      2$              ; IF MINUS END OF BAD SECTORS
4885 017766 012137 002166      MOV      (R1)+,TEMP2      ; GET TRACK AND CYLINDER
4886 017772 000337 002164      SWAB     TEMP1            ; PUT CYLINDER IN HIGH BYTE
4887 017776 006237 002164      ASR      TEMP1            ; ALIGN IT
4888 020002 013712 002164      MOV      TEMP1,(R2)       ; STORE OFF CYLINDER PART
4889 020006 013737 002166 002164      MOV      TEMP2,TEMP1      ; GET SECTOR
4890 020014 042737 177700 002164      BIC      #177700,TEMP1     ; LEAVE ONLY SECTOR
4891 020022 053712 002164      BIS      TEMP1,(R2)       ; SET IN SECTOR BITS
4892 020026 042737 177377 002166      BIC      #177377,TEMP2
4893 020034 006237 002166      ASR      TEMP2
4894 020040 006237 002166      ASR      TEMP2
4895 020044 053722 002166      BIS      TEMP2,(R2)+      ; SET IN HEAD
4896 020050 005300      DEC      R0
4897 020052 001342      BNE      1$
4898 020054 012737 003457 002116      MOV      #MBDMSC,WHY      ; MORE THAN 16 BAD SECTORS
4899 020062 000412      BR       6$
4900
4901 020064 005737 002170      2$  TST      TEMP3            ; SWITCH TO FIELD BAD OR QUIT
4902 020070 001011      BNE      7$              ; QUIT, 7$
4903 020072 012764 077724 000040      MOV      #77724,BDA(R4)   ; SWITCH TO FIELD BAD
4904 020100 012737 000001 002170      MOV      #1,TEMP3         ; SET TO QUIT NEXT TIME THRU
4905 020106 000661      BR       4$
4906
4907 020110 004537 020144      6$  JSR      R5,DRDRV         ; DROP THE DRIVE
4908 020114 004537 022374      7$  JSR      R5,HDHOME        ; BRINGS HEADS HOME
4909 020120 012603      9$  MOV      (SP)+,R3
4910 020122 012602      MOV      (SP)+,R2
4911 020124 012601      MOV      (SP)+,R1
4912 020126 012600      MOV      (SP)+,R0
4913 020130 000205      RTS      R5
4914
4915 020132 004537 020144      8$  JSR      R5,DRDRV
4916 020136 000770      BR       9$
4917
4918
4919
4920
4921
4922
4923
4924      SBTTL  ROUTINE TO DROP DRIVE
4925
4926      ; ROUTINE TO DROP A DRIVE FROM RUNNING
4927      ; R4 HAS BUFFER POINTER OF DRIVE TO DROP
4928      ; WE CLEAR BIT IN "DRUT", NOT "DRPRS"
4929
4930
4931 020140 005237 002310      ODPDRV  INC      OPCALL
4932 020144 010146      ODPDRV  MOV      R1 -(SP)
4933 020146 010246      MOV      R2 -(SP)         ; SAVE REGISTERS
4934 020150 010346      MOV      R3 -(SP)
  
```

|      |        |        |        |        |        |  |                                |
|------|--------|--------|--------|--------|--------|--|--------------------------------|
| 4935 | 020152 | 005237 | 002312 |        | INC    | INCALL   |                                |
| 4936 | 020156 | 005003 |        |        | CLR    | R3   |                                |
| 4937 | 020160 | 012702 | 024752 |        | MOV    | #DRBUF, R2   | , START OF DRIVE BJJFERS       |
| 4938 | 020164 | 012701 | 000001 |        | MOV    | #1, R1   | ; MASK                         |
| 4939 | 020170 | 020402 |        | 15     | CMP    | R4, R2   | , IS THIS THE DRIVE?           |
| 4940 | 020172 | 001405 |        |        | BEQ    | 25   | ; YES GO DROP IT               |
| 4941 | 020174 | 005203 |        |        | INC    | R3   |                                |
| 4942 | 020176 | 006301 |        |        | ASL    | R1   | ; NC SHIFT MASK                |
| 4943 | 020200 | 062702 | 000122 |        | ADD    | #PRPOS+2, R2   | , NEXT BUFFER                  |
| 4944 | 020204 | 000771 |        |        | BR     | 15   | , GO BACK                      |
| 4945 |        |        |        |        |        |  |                                |
| 4946 | 020206 | 005737 | 002310 | 25     | TST    | OPCALL   |                                |
| 4947 | 020212 | 001002 |        |        | BNE    | 65   |                                |
| 4948 | 020214 |        |        |        | DODU   | R3   |                                |
| (3)  | 020214 | 010300 |        |        | MOV    | R3, R0   |                                |
| (3)  | 020216 | 104053 |        |        | EMT    | CSDODU   |                                |
| 4949 | 020220 | 005037 | 002312 | 65     | CLR    | INCALL   |                                |
| 4950 | 020224 | 005037 | 002310 |        | CLR    | OPCALL   |                                |
| 4951 | 020230 | 113764 | 002232 | 000070 | MOVB   | HOUR, DPHOUR(R4)   | , TIME AT WHICH IT WAS DROPPED |
| 4952 | 020236 | 113764 | 002230 | 000071 | MOVB   | MINUTE, DPMIN(R4)  | , HOUR/MINUTE                  |
| 4953 | 020244 | 001002 |        |        | BNE    | 35   | , IF MINUTE 0,                 |
| 4954 | 020246 | 105264 | 000071 |        | INCB   | DPMIN(R4)  | , MAKE 1                       |
| 4955 | 020252 | 140137 | 002120 | 35     | BICB   | R1, DRUT   | , CLEAR THE DRIVE FROM BIT MAP |
| 4956 | 020256 |        |        |        | PRINTF | #FMT7, #TIME, HOUR, MINUTE, SECOND, #MRLCS, DCS(R4), #DRNM |                                |
| (14) | 020256 | 012746 | 003620 |        | MOV    | #DRNM, -(SP)   |                                |
| (13) | 020262 | 016446 | 000104 |        | MOV    | DCS(R4), -(SP)   |                                |
| (12) | 020266 | 012746 | 002323 |        | MOV    | #MRLCS, -(SP)  |                                |
| (11) | 020272 | 013746 | 002226 |        | MOV    | SECOND, -(SP)  |                                |
| (10) | 020276 | 013746 | 002230 |        | MOV    | MINUTE, -(SP)  |                                |
| (9)  | 020302 | 013746 | 002232 |        | MOV    | HOUR, -(SP)  |                                |
| (8)  | 020306 | 012746 | 002314 |        | MOV    | #TIME, -(SP)   |                                |
| (7)  | 020312 | 012746 | 006072 |        | MOV    | #FMT7, -(SP)   |                                |
| (6)  | 020316 | 012746 | 000010 |        | MOV    | #10, -(SP)   |                                |
| (3)  | 020322 | 010600 |        |        | MOV    | SP, R0   |                                |
| (4)  | 020324 | 104017 |        |        | EMT    | CSPNTF   |                                |
| (4)  | 020326 | 062706 | 000022 |        | ADD    | #22, SP  |                                |
| 4957 | 020332 |        |        |        | PRINTF | #FMT7A, (B, DRSEL+1, R4), #DROP, WHY                       |                                |
| (10) | 020332 | 013746 | 002116 |        | MOV    | WHY, -(SP)   |                                |
| (9)  | 020336 | 012746 | 004067 |        | MOV    | #DROP, -(SP)   |                                |
| (8)  | 020342 | 005046 |        |        | CLR    | -(SP)  |                                |
| (8)  | 020344 | 156416 | 000107 |        | BISB   | DRSEL+1(R4), (SP)  |                                |
| (7)  | 020350 | 012746 | 006125 |        | MOV    | #FMT7A, -(SP)  |                                |
| (6)  | 020354 | 012746 | 000004 |        | MOV    | #4, -(SP)  |                                |
| (3)  | 020360 | 010600 |        |        | MOV    | SP, R0   |                                |
| (4)  | 020362 | 104017 |        |        | EMT    | CSPNTF   |                                |
| (4)  | 020364 | 062706 | 000012 |        | ADD    | #12, SP  |                                |
| 4958 | 020370 |        |        |        | PRINTF | #FMTS1   |                                |
| (7)  | 020370 | 012746 | 006703 |        | MOV    | #FMTS1, -(SP)  |                                |
| (6)  | 020374 | 012746 | 000001 |        | MOV    | #1, -(SP)  |                                |
| (3)  | 020400 | 010600 |        |        | MOV    | SP, R0   |                                |
| (4)  | 020402 | 104017 |        |        | EMT    | CSPNTF   |                                |
| (4)  | 020404 | 062706 | 000004 |        | ADD    | #4, SP   |                                |
| 4959 |        |        |        |        |        |  |                                |
| 4960 | 020410 | 004737 | 011634 |        | JSR    | PC REPORT  |                                |
| 4961 |        |        |        |        |        |  |                                |
| 4962 | 020414 | 012603 |        |        | MOV    | (SP)+ R2   |                                |

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4963 020416 012602          MOV      (SP)+,R2      ,RESTORE REGISTERS
4964 020420 012601          MOV      (SP)+,R1
4965
4966 020422 000205          RTS      R5
4967
4968          SBTTL  ROUTINE TO CHECK DATA
4969
4970          ,ROUTINE TO CHECK DATA ON READ
4971
4972 020424 005737 007504      CKDATA  TST      CMRD          ;DO WE WANT TO CHECK ANY?
4973 020430 001001          BNE      97$          ,YES CONTINUE
4974 020432 000205          RTS      R5          ,NO, EXIT
4975 020434          97$  SETPRI  #340
      (3) 020434 012700 000340      MOV      #340,R0
      (3) 020440 104041          EMT      C$SPR1
4976 020442 017402 000110      MOV      @BBA(R4),R2      ,BUFFER START
4977 020446 016437 000042 002164      MOV      BIP(R4),TEMP1    ,WORDS READ IN
4978 020454 005437 002164      NEG      TEMP1          ,MAKE POSITIVE
4979 020460 013737 007506 002166      MOV      DELMT,TEMP2     ,# ERRORS TO BE PRINTED
4980 020466 005037 002160      CLR      DECNT          ,INIT ERROR COUNT
4981 020472 013737 007504 002170      MOV      CMRD,TEMP3      ,# WORDS TO BE COMPARED
4982 020500 012737 000176 002162 96$  MOV      #126.,TEMPO      ,126 WORDS
4983 020506 012201          MOV      (R2)+,R1        ,NON-ZERO WORDS
4984 020510 005337 002164      DEC      TEMP1
4985 020514 001516          BEQ      CEND
4986 020516 005301          DEC      R1
4987 020520 012237 002172      MOV      (R2)+,TEMP4     ,PATTERN ADDRESS
4988
4989          MAKE SURE PATTERN ADDRESS IS LEGAL
4990
4991 020524 012700 024324      MOV      #PATLST,R0      ,GET LIST OF PATTERNS
4992 020530 012703 000010      MOV      #8,R3          ,ONLY EIGHT
4993 020534 022037 002172 98$  CMP      (R0)+,TEMP4     ,FOUND IT YET
4994 020540 001412          BEQ      99$          ,YES, CONTINUE
4995 020542 005303          DEC      R3          ,NO, EXHAUST LIST YET
4996 020544 001373          BNE      98$          ,NO, GO BACK
4997
4998 020546 024242          CMP      -(R2),-(R2)
4999 020550          ERRHRD 180 ,NOREV EPP13
      (3) 020550 104463          TRAP    T$ERCODE
      (5) 020552 000264          WORD   180
      (5) 020554 003420          WORD   NOREV
      (5) 020556 005156          WORD   ERR13
5000 020560 004537 027514      JSP     R5,STOMP
5001 020564 000205          RTS      R5
5002
5003 020566 005301          99$  DEC      R1          ACCOUNT FOR PATTERN ADDRESS
5004 020570 013703 002172      MOV      TEMP4,R3      ,GET ADDRESS
5005 020574 005337 002164      DEC      TEMP1        ,ACCOUNT ONCE AGAIN
5006 020600 012737 000020 002174      MOV      #16,TEMP5     ,16 ENTRIES TO PATTERN
5007 020606 005737 002164 1$  TST     TEMP1        ,ANY WORDS READIN LEFT?
5008 020612 001457          BEQ     CEND          ,NO, GO TO END
5009 020614 005737 002170      TST     TEMP3        ,HAVE WE EXHAUSTED COMPARE LIMIT?
5010 020620 001454          BEQ     CEND          ,YES GO TO END
5011 020622 005701          TST     R1          ,WE CHECKING PATTERN OP DEP: FILL?
5012 020624 001416          BEQ     3$          ZERO FILL SHIP
  
```

|      |        |        |        |        |        |                  |                          |
|------|--------|--------|--------|--------|--------|------------------|--------------------------|
| 5013 | 020626 | 005301 |        |        | DEC    | R1               | , PATTERN                |
| 5014 | 020630 | 005737 | 002174 |        | TST    | TEMP5            | ; WITHIN PATTERN         |
| 5015 | 020634 | 001005 |        |        | BNE    | 2\$              | ; YES SKIP               |
| 5016 | 020636 | 013703 | 002172 |        | MOV    | TEMP4, R3        | ; NO, START OVER         |
| 5017 | 020642 | 012737 | 000020 | 002174 | MOV    | #16, TEMP5       | ; 16 ENTRIES             |
| 5018 | 020650 | 012337 | 002216 |        | MOV    | (R3)+, GODAT     | ; GET PATTERN            |
| 5019 | 020654 | 005337 | 002174 |        | DEC    | TEMP5            | ; DOWN COUNT             |
| 5020 | 020660 | 000402 |        |        | BR     | 4\$              |                          |
| 5021 | 020662 | 005037 | 002216 |        | CLR    | GODAT            | ; ZERO FILL              |
| 5022 | 020666 | 023712 | 002216 |        | CMF    | GODAT, (R2)      | ; CORRECT DATA           |
| 5023 | 020672 | 001415 |        |        | BEQ    | 5\$              | ; YES YES NEXT           |
| 5024 | 020674 | 005237 | 002160 |        | INC    | DECNT            | ; DATA ERROR             |
| 5025 | 020700 | 005264 | 000074 |        | INC    | DATCER(R4)       |                          |
| 5026 | 020704 | 005737 | 002166 |        | TST    | TEMP2            | ; DO WE WANT TO PRINT IT |
| 5027 | 020710 | 001406 |        |        | BEQ    | 5\$              | ; NO, SKIP               |
| 5028 |        |        |        |        |        |                  |                          |
| 5029 | 020712 |        |        |        | ERRHRD | 180, MDCER, ERR8 |                          |
| (3)  | 020712 | 104463 |        |        | TRAP   | T\$ERCODE        |                          |
| (5)  | 020714 | 000264 |        |        | WORD   | 180              |                          |
| (5)  | 020716 | 003024 |        |        | WORD   | MDCER            |                          |
| (5)  | 020720 | 004650 |        |        | WORD   | ERR8             |                          |
| 5030 | 020722 | 005337 | 002166 |        | DEC    | TEMP2            | ; ACCOUNT FOR PRINT      |
| 5031 |        |        |        |        |        |                  |                          |
| 5032 | 020726 | 005337 | 002164 |        | DEC    | TEMP1            | ; WORDS READ IN          |
| 5033 | 020732 | 001407 |        |        | BEQ    | CEND             |                          |
| 5034 | 020734 | 005722 |        |        | TST    | (R2)+            | NEXT WORD                |
| 5035 | 020736 | 005337 | 002162 |        | DEC    | TEMPO            |                          |
| 5036 | 020742 | 001656 |        |        | BEQ    | 96\$             |                          |

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DZPLER P11 14-NOV-77 14.04 ROUTINE TO CHECK DATA

E 7

SEQ 0082

|      |        |        |        |      |     |       |                               |
|------|--------|--------|--------|------|-----|-------|-------------------------------|
| 5038 | 020744 | 005337 | 002170 |      | DEC | TEMP3 | . WORDS TO CHECK              |
| 5039 | 020750 | 000716 |        |      | BR  | 15    |                               |
| 5040 |        |        |        |      |     |       |                               |
| 5041 | 020752 | 005737 | 002160 | CEND | TST | DECNT | . DO WE WANT TO PRINT SUMMARY |
| 5042 | 020756 | 001406 |        |      | BEQ | 15    | . NO, EXIT                    |
| 5043 |        |        |        |      |     |       |                               |

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5045 020760 005464 000042          NEG      BMP(R4)          ,MAKE POSITIVE WORD COUNT
5046 020764          ERRHRD  190 ,MDCER,ERR6 ,DATA ERROR SUMMARY
    020764 104463          TRAP    T$ERCODE
    (5) 020766 000276          WORD    190
    (5) 020770 003024          WORD    MDCER
    (5) 020772 004552          WORD    ERR6
5047
5048 020774 000205          15      RTS      R5
5049
5050          SBTTL  ROUTINE TO WAIT FOR CONTROLLER READY
5051
5052
5053          ,ROUTINE TO WAIT FOR CONTROLLER READY UNDER FLAG
5054          ,MODE USED IN INITIALIZE PORTION OF PROGRAM I E
5055          ,GETTING BAD SECTOR FILE, WRITING PACK INITIALLY
5056
5057 020776 010046          WTPDY  MOV      R0,-(SP)          ,SAVE REGISTERS
5058 021000 010146          MOV      R1,-(SP)
5059 021002 012701 001750          MOV      #1000 ,R1          ,WAIT A WHILE
5060 021006          15      WAITUS  #2
    (3) 021006 012700 000002          MOV      #2 ,R0
    (3) 021012 104027          EMT     C$WTU
5061 021014 032774 000200 000104          BIT      #CRDY,DCS(R4) ,READY SET?
5062 021022 001006          BNE     25          ,YES, EXIT
5063 021024 005301          DEC     R1          ,TIMED OUT?
5064 021026 001367          BNE     15          ,NO GO BACK
5065
5066 021030          ERPDF  1002 ,NOCRDY,ERR12
    (3) 021030 104462          TRAP    T$ERCODE
    (5) 021032 001752          WORD    1002
    (5) 021034 002450          WORD    NOCRDY
    (5) 021036 005150          WORD    ERR12
5067
5068 021040 012601          25      MOV      (SP)+,R1          ,RESTORE REGISTERS
5069 021042 012600          MOV      (SP)+,R0
5070 021044 000205          RTS     R5
5071
5072
5073          SBTTL  GET STATUS, DRIVE RESET ROUTINE
5074
5075          ROUTINE TO ISSUE DRIVE RESET
5076          ALSO GET STATUS, R1 HAS STATUS IF GS
5077          USES R3, DOES NOT SAVE IT
5078
5079 021046 016403 000104          GETDST MOV      DCS(R4),R3
5080 021052 012763 000003 000004          MOV      #GSBIT,DA(R3)
5081 021060 000405          BR     C$STUFF
5082 021062 016403 000104          ISDRST MOV      DCS(R4),R3
5083 021066 012763 000013 000004          MOV      #DRST,DA(R3)
5084 021074 012763 000204 000000          C$STUFF MOV     #CRDY!GSTAT,CS(R3)
5085 021102 056463 000106 000000          BIS     DRSEL(R4),CS(R3)
5086 021110 042763 000200 000000          BIC     #CRDY,CS(R3)
5087 021116 004537 020776          JSR     R5,WTPDY
5088 021122 022763 000013 000004          CMP     #DRST,DA(R3)
5089 021130 001402          BEQ     15
5090 021132 016301 000006          MOV     MP(R3),R1
  
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5091 021136 000205      15      RTS      R5
5092
5093
5094      SBTTL      ROUTINE TO GENERATE A RANDOM NUMBER
5095
5096 021140 010146      RAND      MOV      R1, -(SP)
5097 021142 010246      MOV      R2, -(SP)
5098 021144 010346      MOV      R3, -(SP)
5099
5100 021146 013703 002126      MOV      LONUM, R3
5101 021152 013701 002124      MOV      HINUM, R1
5102 021156 012702 177771      MOV      #-7, R2
5103 021162 006303      15      ASL      R3
5104 021164 006101      RCL      R1
5105 021166 005202      INC      R2
5106 021170 001374      BNE      15
5107 021172 063703 002126      ADD      LONJM, R3
5108 021176 005501      ADC      R1
5109 021200 063701 002124      ADD      HINUM, R1
5110 021204 062703 001057      ADD      #1057, R3
5111 021210 005501      ADC      R1
5112 021212 062701 047401      ADD      #47401, R1
5113 021216 010337 002124      MOV      R3, HINUM
5114 021222 010137 002126      MOV      R1, LONUM
5115 021226 012603      MOV      (SP)+, R3
5116 021230 012602      MOV      (SP)+, R2
5117 021232 012601      MOV      (SP)+, R1
5118 021234 000205      RTS      R5
5119
5120      SBTTL      ROUTINE TO WRITE PACKS IN TIALLY
5121
5122      .ROUTINE TO WRITE PACK WITH PATTERN. ALL TRACKS WILL BE
5123      .WRITTEN (EXCEPT BAD SECTOR TRACK)
5124      .FORMAT IS # OF WORDS (WORD 1), PATTEPN ADDRESS (WORD 2)
5125      .PATTERN (WORDS 3 - 128)
5126      .WE WILL ATTEMPT TO WRITE MULTIPLE SECTORS AT A TIME
5127      .(MINIMUM 10 SECTORS) IF AN ERROR OCCUPS WE WILL THEN
5128      .WRITE INDIVIDUAL SECTORS FOR THAT TRACK. WE DO WRITES
5129      .PEADS AND INCORE COMPARISONS TO VERIF
5130
5131
5132      CALL JSR R5 WRPACK
5133
5134 021236 010046      WRPACK   MOV      R0, -(SP)      .-R0E REG ESTERF
5135 021240 010146      MOV      R1, -(SP)
5136 021242 010246      MOV      R2, -(SP)
5137 021244 010346      MOV      R3, -(SP)
5138 021246 016446 000110      MOV      BBA(R4), -(SP)
5139 021252      PRINTF  #FMT18, #MSWRPK
5140 (8) 021252 012746 004171      MOV      #MSWRPK, -(SP)
5140 (7) 021256 012746 006676      MOV      #FMT18, -(SP)
5140 (6) 021262 012746 000002      MOV      #2, -(SP)
5140 (3) 021266 010600      MOV      SP, R0
5140 (4) 021270 104317      EMT      C$PNTF
5140 (4) 021272 062706 000006      ADD      #6, SP
5140 021276      PRINTF  #FMT17 #MPLCS DCS R4 #CPNM B [RTEL+1] R4

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11) 021276 005046 CLR -(SP)
11) 021300 156416 000107 BISB DRSEL+1(R4), (SP)
10) 021304 012746 003620 MOV #DRNM, -(SP)
9) 021310 016446 000104 MOV DCS(R4), -(SP)
8) 021314 012746 002323 MOV #MRLCS, -(SP)
7) 021320 012746 005647 MOV #FMT17, -(SP)
6) 021324 012746 000005 MOV #5, -(SP)
3) 021330 010600 MOV SP, R0
4) 021332 104017 EMT C$PNTF
4) 021334 062706 000014 ADD #14, SP
5141 021340 004537 022374 JSR R5, HDHOME ; HEADS HOME
  
```

NOW ACTUALLY WRITE DATA OUT ON PACK. WILL NOT WRITE LAST TRACK

```

5148 021344 005037 002164 CLR TEMP1 ; TEMP1=HEAD
5149 021350 005001 CLR R1 ; R1=CYL
5150 021352 022701 077600 CONWR CMP #77600 P1 ; CYL=255?
5151 021356 001014 BNE STWRT ; NO GO WRITE TRACK
5152 021360 005737 002164 TST TEMP1 ; YES. CHECK IF HEAD = 1?
5153 021364 001411 BEQ STWRT ; HEAD = 0 GO WRITE
5154 021366 004537 022374 ENDWR JSR R5, HDHOME ; HEADS HOME
5155 021372 012664 003110 MOV (SP)+, BBA(P4)
5156 021376 012603 MOV (SP)+, R3
5157 021400 012602 MOV (SP)+, R2
5158 021402 012601 MOV (SP)+, R1
5159 021404 012600 MOV (SP)+, R0
5160 021406 000205 RTS R5 ; END EXIT
  
```

THIS PORTION WILL WRITE THE PACK USING MULTIPLE SECTORS IF A ERROR OCCURS WE WILL GO TO 2\$ AND INDIVIDUAL SECTORS

```

5165 021410 005002 STWRT CLR R2 ; INITIAL SECTOR 0
5166 021412 012764 002252 000110 MOV #BUF1, BBA(P4) ; BUFFER START
5167 021420 012764 175400 000042 MOV #-1280, BMF(P4) ; 10 SECTORS
5168 021426 004537 017154 JSR R5, WRBUF ; WRITE BUFFER INTO MEMORY
5169 021432 010164 000040 201$ MOV R1, BDA(P4) ; SET UP SECTOR
5170 021436 053764 002164 000040 BIS TEMP1, BDA(P4)
5171 021444 050264 000040 BIS R2, BDA(P4)
5172 021450 012764 002252 000110 MOV #BUF1, BBA(P4) ; SET UP TO WRITE
5173 021456 012764 000012 000044 MOV #WRITE, FUNC(P4) ; WRITE
5174 021464 004537 014042 JSP R5, LDFUNC
5175 021470 004537 020776 JSR R5, WTRDY ; WAIT FOR READ
5176 021474 005774 000104 TST @DCS(R4) ; ERROR
5177 021500 100003 BPL 203$
5178 021502 004537 021062 205$ JSR R5, ISDRST
5179 021506 000421 BR 2$
5181 021510 012764 000002 000044 203$ MOV #WRCHK, FUNC(P4)
5182 021516 004537 014042 JSR R5, LDFUNC
5183 021522 004537 020776 JSR R5, WTRDY
5184 021526 005774 000104 TST @DCS(R4) ; ERROR
5185 021532 100763 BMI 205$ ; YES GO DO SECTORS INDIVIDUALLY
5186
  
```

```

5187
5188 021534 062702 000012          ADD    #10 ,R2          ,NEXT GROUP
5189 021540 022702 000050          CMP    #40 ,R2          ,DONE?
5190 021544 001332                BNE    201$             ,NO, GO BACK
5191 021546 000137 022050          JMP    952$             ,YES NEXT TRACK
5192
5193                , IF AN ERROR OCCURS THEN WE COME HERE AND DO THE TRACK SECTOR
5194                , BY SECTOR
5195
5196 021552 005002                2$     CLR    R2                ,R2 = SECTOR
5197
5198 021554 012764 177600 000042          MOV    #-128 ,BMP(R4)  ;LOAD WORD COUNT
5199 021562 010164 000040                3$     MOV    R1,BDA(R4)      ;SETUP DISK ADDRESS
5200 021566 053764 002164 000040          BIS    TEMP1,BDA(R4)
5201 021574 050264 000040          BIS    R2,BDA(R4)
5202
5203 021600 012764 002252 000110          MOV    #BUF1,BBA(R4)
5204 021606 004537 017154                JSP    R5,WRBUF        ,WRITE A BUFFER
5205 021612 005037 002114                91$   CLR    RWCNT          ,CLEAR RETRYS OUT
5206 021616 005037 002160                98$   CLR    DECNT
5207 021622 012764 000012 000044          96$   MOV    #WRITE,FUNC(R4) ,WRITE FUNCTION
5208 021630 004537 014042                JSR    R5,LDFUNC
5209 021634 004537 020776                JSR    R5,WTRDY        ,WAIT FOR WRITE TO FINISH
5210
5211 021640 005774 000104                TST    @DCS(R4)        ,ERROR ON WRITE?
5212 021644 100023                BPL    85$             ,NO, GO READ
5213
5214 021646 004537 021062                JSR    R5,ISDRST
5215 021652 016437 000040 002156          MOV    BDA(R4),CHKSEC ,YES, CHECK IF SECTOR IS IN
5216 021660 004537 023640                JSP    R5,CKBOSC      ,BAD SECTOR FILE
5217 021664 005737 002154                TST    HDRFND
5218 021670 001050                BNE    95$             ,IF SET, IT WAS
5219                                ,YES GO TO NEXT SECTOR
5220 021672 005237 002160                INC    DECNT
5221 021676 023727 002160 000002          CMP    DECNT,#2
5222 021704 001346                BNE    96$             ,NO, GIVE IT ONE MORE TRY
5223                                ,IT MAY HAVE BEEN NOISE.
5224
5225 021706 004537 022134                JSR    R5,INBAC
5226 021712 000437                BR     95$
5227
5228
5229 021714 005037 002112                85$   CLR    RECNT          ,CLEAR RETRY COUNT
5230 021720 012764 000002 000044          30$   MOV    #WRCHK,FUNC(R4) ,
5231 021726 004537 014042                JSR    R5,LDFUNC
5232 021732 004537 020776                JSR    R5,WTRDY
5233
5234 021736 005774 000104                TST    @DCS(R4)        ,ERROR ON READ
5235 021742 100023                BPL    81$             ,NO, GO COMPARE
5236 021744 004537 021062                JSR    R5,ISDRST
5237
5238 021750 016437 000040 002156          MOV    BDA(R4),CHKSEC ,CHECK IF SECTOR IS
5239 021756 004537 023640                JSR    R5,CKBOSC      ,A KNOWN BAD SECTOR
5240 021762 005737 002154                TST    HDRFND
5241 021766 001011                BNE    95$             ,IT WAS THEN
5242                                ,GO TO NEXT SECTOR

```

|      |        |        |        |        |       |        |                   |                             |
|------|--------|--------|--------|--------|-------|--------|-------------------|-----------------------------|
| 5243 | 021770 | 005237 | 002112 |        |       | INC    | RECNT             | .GIVE IT ANOTHER CHANCE     |
| 5244 | 021774 | 023727 | 002112 | 000002 |       | CMP    | RECNT, #2.        |                             |
| 5245 | 022002 | 001346 |        |        |       | BNE    | 80\$              |                             |
| 5246 |        |        |        |        |       |        |                   |                             |
| 5247 | 022004 | 004537 | 022134 |        |       | JSR    | R5, INBAD         |                             |
| 5248 | 022010 | 000400 |        |        |       | BR     | 95\$              |                             |
| 5249 |        |        |        |        |       |        |                   |                             |
| 5250 | 022012 |        |        |        | 81\$  |        |                   |                             |
| 5251 |        |        |        |        |       |        |                   |                             |
| 5252 | 022012 | 062702 | 000012 |        | 95\$  | ADD    | #10, R2           | .NEXT SECTOR (OFFSET BY 10) |
| 5253 | 022016 | 020227 | 000047 |        |       | CMP    | R2, #39           | .DONE WITH TRACK?           |
| 5254 | 022022 | 003002 |        |        |       | BGT    | 951\$             | .YES NEXT TRACK             |
| 5255 | 022024 | 000137 | 021562 |        |       | JMP    | 3\$               | .NO GO BACK FOR NEXT SECTOR |
| 5256 | 022030 |        |        |        | 951\$ |        |                   |                             |
| 5257 | 022030 | 005202 |        |        |       | NC     | R2                | .NEXT SECTOR                |
| 5258 | 022032 | 162702 | 000050 |        |       | SUB    | #40, R2           | .DONE WITH TRACK?           |
| 5259 | 022036 | 020227 | 000012 |        |       | CMP    | R2, #10           |                             |
| 5260 | 022042 | 001402 |        |        |       | BEQ    | 952\$             | .YES                        |
| 5261 | 022044 | 000137 | 021562 |        |       | JMP    | 3\$               | .NO                         |
| 5262 | 022050 |        |        |        | 952\$ |        |                   |                             |
| 5263 |        |        |        |        |       |        |                   |                             |
| 5264 | 022050 | 005737 | 002164 |        |       | TST    | TEMP1             | .WHICH SURFACE?             |
| 5265 | 022054 | 001420 |        |        |       | BEQ    | 5\$               | .TOP (0), BRANCH            |
| 5266 |        |        |        |        |       |        |                   |                             |
| 5267 | 022056 | 005037 | 002164 |        |       | CLR    | TEMP1             | BOTTOM. SWITCH TO TOP WITH  |
| 5268 | 022062 | 062701 | 000200 |        |       | ADD    | #200, R1          |                             |
| 5269 | 022066 | 012764 | 000205 | 000040 |       | MOV    | #205, BDA(R4)     | SEEK GC IN ALSO             |
| 5270 | 022074 | 012764 | 000006 | 000044 | 4\$   | MOV    | #SEEK, FUNC(R4)   | .GO SEEK                    |
| 5271 | 022102 | 004537 | 014042 |        |       | JSR    | R5, LDFUNC        |                             |
| 5272 | 022106 | 004537 | 020776 |        |       | JSR    | R5, WTRDY         |                             |
| 5273 |        |        |        |        |       |        |                   |                             |
| 5274 | 022112 | 000137 | 021352 |        |       | JMP    | CONWR             |                             |
| 5275 |        |        |        |        |       |        |                   |                             |
| 5276 | 022116 | 012737 | 000100 | 002164 | 5\$   | MOV    | #HEAD, TEMP1      | WAS TOP MAKE BOTTOM         |
| 5277 | 022124 | 012764 | 000021 | 000040 |       | MOV    | #21, BDA(R4)      |                             |
| 5278 | 022132 | 000760 |        |        |       | BR     | 4\$               |                             |
| 5279 |        |        |        |        |       |        |                   |                             |
| 5280 |        |        |        |        |       |        |                   |                             |
| 5281 | 022134 | 016337 | 000000 | 002234 | INBAD | MOV    | CS(R3), E CS      |                             |
| 5282 | 022142 | 016337 | 000002 | 002236 |       | MOV    | BA(R3), E BA      |                             |
| 5283 | 022150 | 016337 | 000004 | 002240 |       | MOV    | DA(R3), E DA      |                             |
| 5284 | 022156 | 016337 | 000006 | 002242 |       | MOV    | MP(R3), E MP      |                             |
| 5285 | 022164 | 016337 | 000006 | 002244 |       | MOV    | MP(R3), E MP1     |                             |
| 5286 | 022172 | 016337 | 000006 | 002246 |       | MOV    | MP(R3), E MP2     |                             |
| 5287 | 022200 |        |        |        |       | ERRHRD | 199, NWRTS, ERR13 |                             |
| (3)  | 022200 | 104463 |        |        |       | TRAP   | TSERCODE          |                             |
| (5)  | 022202 | 000307 |        |        |       | WORD   | 139               |                             |
| (5)  | 022204 | 002525 |        |        |       | WORD   | NWRTS             |                             |
| (5)  | 022206 | 005156 |        |        |       | WORD   | ERR13             |                             |
| 5288 | 022210 | 005264 | 000012 |        |       | INC    | ERRCNT(R4)        |                             |
| 5289 | 022214 | 005737 | 007532 |        |       | TST    | T DRP             | .ARE WE COUNTING ERRORS     |
| 5290 | 022220 | 001413 |        |        |       | BEQ    | 2\$               | .NO                         |
| 5291 | 022222 | 026437 | 000012 | 007472 |       | CMP    | ERRCNT(R4), ERLMT | .PAST IT                    |
| 5292 | 022230 | 103407 |        |        |       | BLO    | 2\$               | .NO                         |
| 5293 | 022232 | 012737 | 003111 | 002116 |       | MOV    | #ERLMTM, WHY      |                             |
| 5294 | 022240 | 004537 | 020144 |        |       | JSR    | R5, OPDRV         |                             |

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 DZRLEA P11 14-NOV-77 14 04 ROUTINE TO WRITE PACKS INITIALLY

SEQ 0088

```

5295 022244 012705 021366          MOV    #ENDWR,R5
5296
5297 022250 000205          2$    RTS    R5
5298          SBTTL  ROUTINE FOR SYSTEM CLOCK
5299
5300          ,ROUTINE TO READ SYSTEM CLOCK
5301          ,USES 'REGTIM' FROM DIAGNOSTIC SUPERVISOR
5302
5303 022252 005737 002250  GETSYS  TST    SYCLK      ;DO WE HAVE A CLOCK
5304 022256 001002          BNE    4$        ;YES, SO SERVICE IT
5305 022260          BREAK      ;NO, CALL SUPER FOR C
(3) 022260 104022          EMT    CSBRK
5306 022262 000205          RTS    R5        ;EXIT
5307 022264          4$    REGTIM  R0        ;GET PRESENT TIME
(3) 022264 104045          EMT    CSREGTIM
5308 022266 020037 002224  1$    CMP    R0,LSTTIM ;HAS IT MOVED
5309 022272 001437          BEQ    3$        ;NO MOVEMENT SINCE LAST CALL
5310 022274 013701 002224          MOV    LSTTIM,R1 ;CALCULATE DIFFERENCE
5311 022300 010037 002224          MOV    R0,LSTTIM ;AND FIX ACCORDINGLY
5312 022304 160100          SUB    R1,R0
5313 022306 060037 002226  2$    ADD    R0,SECOND ;BUMP SECONDS
5314 022312 022737 000074 002226  CMP    #60,SECOND ;SECONDS OVERFLOW
5315 022320 003024          BGT    3$
5316 022322 162737 000074 002226  7$    SUB    #60,SECOND
5317 022330 005237 002222          INC    INTERVAL ;TIME BETWEEN REPORTS
5318 022334 005237 002230          INC    MINUTE    ;PUMP M NUTES
5319 022340 022737 000074 002226  CMP    #60,SECOND
5320 022346 002765          BLT    7$
5321 022350 022737 000074 002230  CMP    #60,MINUTE
5322 022356 003005          BGT    3$
5323 022360 005237 002232          INC    HOUR
5324 022364 162737 000074 002230  SUB    #60,MINUTE
5325 022372 000205  3$    RTS    R5
5326
5327          SBTTL  HEADS HOME ROUTINE
5328
5329          ,ROUTINE TO BRING HEADS OVER TRACK 0
5330
5331 022374 010046          HDHOME  MOV    R0,-(SP) ;SAVE R0
5332 022376 012764 000010 000044  MOV    #RDHDR,FUNC(R4) ;READ HEADER
5333 022404 004537 014042          JSR    R5,LDFUNC ;GO DO IT
5334 022410 004537 020776          JSR    R5,WTRDY
5335
5336 022414 016300 000006          MOV    MP(R3),R0 ;GET HEADER
5337 022420 042700 000177          BIC    #177,R0 ;ONLY CYLINDER
5338 022424 010064 000040          MOV    R0,BDA(R4) ;MOVE IT TO BUFFERED DA
5339 022430 052764 000001 000040  BIS    #1K,BDA(R4) ;SET MARKER
5340 022436 012764 000006 000044  MOV    #SEEK,FUNC(R4) ;LOAD SEEK
5341 022444 004537 014042          JSR    R5,LDFUNC ;SEEK
5342 022450 004537 020776          JSR    R5,WTRDY ;WAIT
5343 022454 016464 000120 000050  MOV    PRPOS(R4),LSTHDR(R4)
5344 022462 005064 000120          CLR    PRPOS(R4) ;SET BUFFER TO HOME
5345 022466 012600          MOV    (SP)+,R0
5346 022470 000205          .RTS   R5
5347
5348          SBTTL  RANDOM WC AND DA ROUTINE

```

```

5349
5350      , ROUTINE TO GET RANDOM SECTOR AND WORD COUNT FOR R/W TRANSFER
5351      , SECTOR IS CHOSEN BETWEEN MIN/MAX LIMITS. WORD COUNT IS BETWEEN
5352      , MIN/MAX WORD COUNT WORD COUNT WILL BE ADJUSTED NOT TO CAUSE
5353      , TRACK OVERFLOW IF HIGH SECTORS ARE CHOSEN ...
5354      , R4 HAS BUFFER OF DRIVE WE'RE WORKING WITH
5355      , ON EXIT - BMP(R4) HAS WORD COUNT
5356      ,           - BOA(R4)      HAS      DISK ADDRESS
5357
5358 022472 023737 007524 007526 GWCDR  CMP      T MXS, T MNS      , MIN MAX SECTORS EQUAL
5359 022500 001003                BNE      99$          , NO. CALCULATE ONE
5360 022502 013702 007524        MOV      T MXS, R2      , LOAD SECTOR
5361 022506 000421                BR       5$           , GO GET WC
5362 022510 004537 021140        JSR      R5, RAND      , GET RANDOM # FOR SECTOR
5363 022514 013702 002126        MOV      LONUM, R2
5364 022520 042702 177700        BIC      #177700, R2   , 0-77 ONLY
5365 022524 023702 007524        CMP      T MXS, R2      , R2 LOWER THAN MAX
5366 022530 103003                BHIS     3$           , BRANCH IF YES
5367 022532 006202                ASR      R2            , HALF IT
5368 022534 005202                INC      R2            , INC SO NOT 0
5369 022536 000770                BR       1$
5370 022540 020237 007526        CMP      R2, T MNS      , MIN OKAY
5371 022544 103002                BHIS     5$
5372 022546 006102                ROL      R2
5373 022550 000763                BR       1$
5374
5375
5376      , NOW GET WORD COUNT
5377
5378 022552 005737 007560        5$      TST      T STIP
5379 022556 001003                BNE      95$
5380 022560 013737 002256 007512  MOV      MAXWC, T MXB
5381 022566 023737 002256 007512  95$     CMP      MAXWC, T MXB
5382 022574 103021                BHIS     97$
5383
5384 022576                PRINTF  #FMT13D, #OVER T MXB MAXWC
(10) 022576 013746 002256        MOV      MAXWC, -(SP)
(9)  022602 013746 007512        MOV      T MXB, -(SP)
(8)  022606 012746 003242        MOV      #OVER, -(SP)
(7)  022612 012746 006446        MOV      #FMT13D, -(SP)
(6)  022616 012746 000004        MOV      #4, -(SP)
(3)  022622 010600                MOV      SP, R0
(4)  022624 104017                EMT      C$PNTF
(4)  022626 062706 000012        ADD      #12, SP
5385 022632 013737 002256 007512  MOV      MAXWC, T MXB
5386
5387 022640 023737 007512 007534  97$     CMP      T MXB, T MNB      , MIN MAX EQUAL
5388 022646 003006                BGT      6$
5389 022650 013737 007512 007534        MOV      T MXB, T MNB
5390
5391 022656 013703 007512                MOV      T MXB, R3      , YES SET WC
5392 022662 000421                BR       9$
5393 022664 004537 021140        6$      JSR      R5, RAND      , GET RANDOM WORD COUNT
5394 022670 013703 002126        MOV      LONUM, R3
5395 022674 042703 160000        7$      BIC      #160000, R3      , MAX ...
5396 022700 023703 007512        CMP      T MXB, R3

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```

5397 022704 103003          BHIS      8$
5398 022706 006203          ASR      R3
5399 022710 005203          INC      R3
5400 022712 000770          BR       7$
5401 022714 020337 007534 8$      CMP      R3,T MNB
5402 022720 103002          BHIS     9$
5403 022722 006103          ROL     R3
5404 022724 000763          BR      7$
5405
5406          ,NOW WE HAVE SECTOR AND WORD COUNT, CHECK THAT WORD COUNT WILL FIT ON SECTOR
5407          , IF NOT LOWER SECTOR START
5408
5409
5410 022726 012701 000050 9$      MOV      #40 ,R1          ,SETUP FOR FOURTY SECTORS
5411 022732 005403          NEG     R3              ,MAKE WORD COUNT NEGATIVE
5412 022734 010364 000042          MOV     R3,BMP(R4)     ,LOAD WORD COUNT
5413 022740 005301          11$    DEC     R1              ,DOWN COUNT MINIMUM START SECT NEEDED
5414 022742 062703 000200          ADD     #128 ,R3       ,ONE SECTOR'S WORTH
5415 022746 100774          BMI     11$           ,STILL NEED ANOTHER SECTOR
5416 022750 020201          CMP     R2,R1          ,DID RANDOM SECTOR SUFFICE
5417 022752 101401          BLOS   12$           ,BRANCH IF SUFFICED
5418 022754 010102          MOV     R1,R2          ,NO, THEN MAKE IT FIT
5419 022756 016464 000120 000040 12$    MOV     PRPOS(R4),BDA(R4)
5420 022764 042764 000077 000040          BIC     #77,BDA(R4)
5421 022772 050264 000040          BIS     R2,BDA(R4)
5422 022776 000205          PTS     R5
5423
5424
5425
5426
5427
5428
5429
5430
5431
5432
5433
5434
5435
5436
5437
5438          SBTTL  ROUTINE TO DUMP BUFFER ON DCK
5439
5440          ROUTINE TO DUMP BUFFER ON DCK ERROR, TWO DUMPS ARE POSSIBLE
5441          ,ONE WHERE WE CAN COMPARE WHAT IT SHOULD BE AND THE OTHER
5442          WHEN WE CAN'T
5443
5444 023000 004737 005214          DMPBUF JSR     PC,LINE1
5445
5446
5447          ,CALCULATE THE STARTING BUS ADDRESS FOR THE COMPARE
5448
5449
5450 023004 012737 000200 002300          MOV     #128 ,DWCNT1
5451 023012 016400 000040          MOV     BDA(R4),R0          ,GET STARTING BUS ADDRESS
5452

```

|      |        |        |        |     |        |                                    |                              |
|------|--------|--------|--------|-----|--------|------------------------------------|------------------------------|
| 5453 | 023016 | 013701 | 002240 |     | MOV    | E. DA, R1                          | ; GET PRESENT DISK ADDRESS   |
| 5454 | 023022 | 042700 | 177700 |     | BIC    | #177700, R0                        | ; SAVE SECTOR BITS           |
| 5455 | 023026 | 042701 | 177700 |     | BIC    | #177700, R1                        |                              |
| 5456 | 023032 | 010002 |        |     | MOV    | R0, R2                             | ; SAVE A COPY                |
| 5457 | 023034 | 010103 |        |     | MOV    | R1, R3                             | ; SAVE ANOTHER               |
| 5458 | 023036 | 160203 |        |     | SUB    | R2, R3                             | ; GET DIFF OF SECTORS        |
| 5459 | 023040 | 005002 |        |     | CLR    | R2                                 | ; CALCULATE WORD COUNT       |
| 5460 | 023042 | 062702 | 000200 | 935 | ADD    | #128, R2                           | ; ONE SECTORS WORTH          |
| 5461 | 023046 | 005303 |        |     | DEC    | R3                                 | ; DONE                       |
| 5462 | 023050 | 001374 |        |     | BNE    | 935                                | ; NO                         |
| 5463 | 023052 | 016403 | 000042 |     | MOV    | BMP(R4), R3                        | ; GET WORD COUNT             |
| 5464 | 023056 | 005403 |        |     | NEG    | R3                                 | ; MAKE IT POSITIVE           |
| 5465 | 023060 | 020203 |        |     | CMF    | R2, R3                             | ; WORKING WITH FULL SECTOR   |
| 5466 | 023062 | 003005 |        |     | BGT    | 945                                | ; NO, GO CALC PARTIAL SECTOR |
| 5467 | 023064 | 013702 | 002236 |     | MOV    | E BA, R2                           | ; PRESENT BUS ADDRESS        |
| 5468 | 023070 | 162702 | 000400 |     | SUB    | #400, R2                           | ; START OF COMPARE           |
| 5469 | 023074 | 000412 |        |     | BR     | 965                                | ; GO COMPARE BUFFER          |
| 5470 | 023076 | 160302 |        | 945 | SUB    | R3, R2                             | ; GET SECTOR DIFF            |
| 5471 | 023100 | 012700 | 000200 |     | MOV    | #128, R0                           |                              |
| 5472 | 023104 | 160200 |        |     | SUB    | R2, R0                             |                              |
| 5473 | 023106 | 010037 | 002300 |     | MOV    | R0, DWCNT1                         |                              |
| 5474 | 023112 | 006300 |        |     | ASL    | R0                                 |                              |
| 5475 | 023114 | 013702 | 002236 |     | MOV    | E. BA, R2                          |                              |
| 5476 | 023120 | 160002 |        |     | SUB    | R0 R2                              |                              |
| 5477 | 023122 |        |        | 965 | PRINTB | #FMT13, #BUSAD, R2, #CRLDA, CHKSEC |                              |
| (11) | 023122 | 013746 | 002156 |     | MOV    | CHKSEC, -(SP)                      |                              |
| (10) | 023126 | 012746 | 002373 |     | MOV    | #CRLDA, -(SP)                      |                              |
| (9)  | 023132 | 010246 |        |     | MOV    | R2, -(SP)                          |                              |
| (8)  | 023134 | 012746 | 003723 |     | MOV    | #BUSAD, -(SP)                      |                              |
| (7)  | 023140 | 012746 | 006431 |     | MOV    | #FMT13, -(SP)                      |                              |
| (6)  | 023144 | 012746 | 000005 |     | MOV    | #5, -(SP)                          |                              |
| (3)  | 023150 | 010600 |        |     | MOV    | SP, R0                             |                              |
| (4)  | 023152 | 104014 |        |     | EMT    | C\$PNTB                            |                              |
| (4)  | 023154 | 062706 | 000014 |     | ADD    | #14, SP                            |                              |
| 5478 | 023160 | 012700 | 024324 |     | MOV    | #PATLST, R0                        | ; CHECK PATTERN LIST         |
| 5479 | 023164 | 012701 | 000010 |     | MOV    | #8, R1                             |                              |
| 5480 | 023170 | 022062 | 000002 | 15  | CMF    | (R0)+, 2(R2)                       |                              |
| 5481 | 023174 | 001415 |        |     | BEQ    | 25                                 |                              |
| 5482 | 023176 | 005301 |        |     | DEC    | R1                                 |                              |
| 5483 | 023200 | 001373 |        |     | BNE    | 15                                 |                              |
| 5484 |        |        |        |     |        |                                    |                              |
| 5485 | 023202 |        |        | 35  | PRINTB | #FMT14, #NOREV                     |                              |
| (8)  | 023202 | 012746 | 003420 |     | MOV    | #NOREV, -(SP)                      |                              |
| (7)  | 023206 | 012746 | 006473 |     | MOV    | #FMT14, -(SP)                      |                              |
| (6)  | 023212 | 012746 | 000002 |     | MOV    | #2, -(SP)                          |                              |
| (3)  | 023216 | 010600 |        |     | MOV    | SP, R0                             |                              |
| (4)  | 023220 | 104014 |        |     | EMT    | C\$PNTB                            |                              |
| (4)  | 023222 | 062706 | 000006 |     | ADD    | #6, SP                             |                              |
| 5486 | 023226 | 000532 |        |     | BR     | STDMP                              |                              |
| 5487 |        |        |        |     |        |                                    |                              |
| 5488 | 023230 | 021227 | 000200 | 25  | CMF    | (R2), #128.                        |                              |
| 5489 | 023234 | 101362 |        |     | BHI    | 35                                 |                              |
| 5490 | 023236 | 005037 | 002160 |     | CLR    | DECNT                              |                              |
| 5491 | 023242 | 013701 | 007554 |     | MOV    | T. CLT, R1                         |                              |
| 5492 |        |        |        |     |        |                                    |                              |
| 5493 | 023246 | 012237 | 002162 |     | MOV    | (R2)+, TEMPO                       | ; NONZERO WORD COUNT         |

|      |        |        |        |        |       |        |                            |                   |
|------|--------|--------|--------|--------|-------|--------|----------------------------|-------------------|
| 5494 | 023252 | 013737 | 002162 | 002276 |       | MOV    | TEMPO, DWCNT               |                   |
| 5495 | 023260 | 005437 | 002276 |        |       | NEG    | DWCNT                      |                   |
| 5496 | 023264 | 012237 | 002164 |        |       | MOV    | (R2)+, TEMP1               |                   |
| 5497 | 023270 | 162737 | 000002 | 002162 |       | SUB    | #2, TEMPO                  |                   |
| 5498 | 023276 | 012737 | 000002 | 002166 |       | MOV    | #2, TEMP2                  | ; WORD            |
| 5499 | 023304 | 013703 | 002164 |        |       | MOV    | TEMP1, R3                  | ; PATTERN ADDRESS |
| 5500 | 023310 | 012737 | 000020 | 002174 |       | MOV    | #16, TEMP5                 | ; 16 ENTRIES      |
| 5501 | 023316 | 005737 | 002162 |        | 4\$   | TST    | TEMPO                      | ; ZERO OR PATTERN |
| 5502 | 023322 | 001417 |        |        |       | BEQ    | 6\$                        | ; ZERO BRANCH     |
| 5503 | 023324 | 005337 | 002162 |        |       | DEC    | TEMPO                      |                   |
| 5504 | 023330 | 005737 | 002174 |        |       | TST    | TEMP5                      | ; WITHIN LIST     |
| 5505 | 023334 | 001005 |        |        |       | BNE    | 5\$                        |                   |
| 5506 | 023336 | 012737 | 000020 | 002174 |       | MOV    | #16, TEMP5                 |                   |
| 5507 | 023344 | 013703 | 002164 |        |       | MOV    | TEMP1, R3                  |                   |
| 5508 | 023350 | 012337 | 002216 |        | 5\$   | MOV    | (R3)+, GODAT               |                   |
| 5509 | 023354 | 005337 | 002174 |        |       | DEC    | TEMP5                      |                   |
| 5510 | 023360 | 000402 |        |        |       | BR     | 7\$                        |                   |
| 5511 | 023362 | 005037 | 002216 |        | 6\$   | CLP    | GODAT                      |                   |
| 5512 | 023366 | 005237 | 002276 |        | 7\$   | INC    | DWCNT                      |                   |
| 5513 | 023372 | 021237 | 002216 |        |       | CMP    | (R2), GODAT                |                   |
| 5514 | 023376 | 001422 |        |        |       | BEQ    | 8\$                        |                   |
| 5515 |        |        |        |        |       |        |                            |                   |
| 5516 | 023400 | 005237 | 002160 |        |       | INC    | DECNT                      |                   |
| 5517 | 023404 | 005701 |        |        |       | TST    | R1                         |                   |
| 5518 | 023406 | 001416 |        |        |       | BEQ    | 8\$                        |                   |
| 5519 | 023410 | 005301 |        |        |       | DEC    | R1                         |                   |
| 5520 | 023412 |        |        |        |       | PRINTB | #FMT14B, TEMP2 GODAT, (R2) |                   |
| (10) | 023412 | 011246 |        |        |       | MOV    | (R2), -(SP)                |                   |
| (9)  | 023414 | 013746 | 002216 |        |       | MOV    | GODAT, -(SP)               |                   |
| (8)  | 023420 | 013746 | 002166 |        |       | MOV    | TEMP2, -(SP)               |                   |
| (7)  | 023424 | 012746 | 006514 |        |       | MOV    | #FMT14B, -(SP)             |                   |
| (6)  | 023430 | 012746 | 000004 |        |       | MOV    | #4, -(SP)                  |                   |
| (3)  | 023434 | 010600 |        |        |       | MOV    | SP, R0                     |                   |
| (4)  | 023436 | 104014 |        |        |       | EMT    | CSPNTB                     |                   |
| (4)  | 023440 | 062706 | 000012 |        |       | ADD    | #12, SP                    |                   |
| 5521 |        |        |        |        |       |        |                            |                   |
| 5522 | 023444 | 005237 | 002166 |        | 8\$   | INC    | TEMP2                      |                   |
| 5523 | 023450 | 005722 |        |        |       | TST    | (R2)+                      |                   |
| 5524 | 023452 | 023737 | 002300 | 002166 |       | CMP    | DWCNT1, TEMP2              |                   |
| 5525 | 023460 | 003716 |        |        |       | BLE    | 4\$                        |                   |
| 5526 | 023462 |        |        |        |       | PRINTB | #FMT9A, DECNT, TEMP2       |                   |
| (9)  | 023462 | 013746 | 002166 |        |       | MOV    | TEMP2, -(SP)               |                   |
| (8)  | 023466 | 013746 | 002160 |        |       | MOV    | DECNT, -(SP)               |                   |
| (7)  | 023472 | 012746 | 006214 |        |       | MOV    | #FMT9A, -(SP)              |                   |
| (6)  | 023476 | 012746 | 000003 |        |       | MOV    | #3, -(SP)                  |                   |
| (3)  | 023502 | 010600 |        |        |       | MOV    | SP, R0                     |                   |
| (4)  | 023504 | 104014 |        |        |       | EMT    | CSPNTB                     |                   |
| (4)  | 023506 | 062706 | 000010 |        |       | ADD    | #10, SP                    |                   |
| 5527 |        |        |        |        |       |        |                            |                   |
| 5528 | 023512 | 000205 |        |        |       | RTS    | R5                         |                   |
| 5529 |        |        |        |        |       |        |                            |                   |
| 5530 | 023514 | 013701 | 007554 |        | STOMP | MOV    | T CLT, R1                  |                   |
| 5531 | 023520 | 012703 | 000012 |        |       | MOV    | #10, R3                    |                   |
| 5532 | 023524 |        |        |        | 1\$   | PRINTB | #FMT14A, (R2)              |                   |
| (8)  | 023524 | 011246 |        |        |       | MOV    | (R2), -(SP)                |                   |
| (7)  | 023526 | 012746 | 006502 |        |       | MOV    | #FMT14A, -(SP)             |                   |

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(6) 023532 012746 000002      MOV      #2, -(SP)
(3) 023536 010600      MOV      SP, R0
(4) 023540 104014      EMT      C$PNTB
(4) 023542 062706 000006      ADD      #6, SP
5533 023546 005722      TST      (R2)+
5534 023550 005303      DEC      R3
5535 023552 001012      BNE      2$
5536 023554      PRINTB  #FMT14C
(7) 023554 012746 006511      MOV      #FMT14C, -(SP)
(6) 023560 012746 000001      MOV      #1, -(SP)
(3) 023564 010600      MOV      SP, R0
(4) 023566 104014      EMT      C$PNTB
(4) 023570 062706 000004      ADD      #4, SP
5537 023574 012703 000012      MOV      #10, R3
5538 023600 005337 002300      2$      DEC      DWCNT1
5539 023604 001001      BNE      3$
5540 023606 000205      RTS      R5
5541 023610 005301      3$      DEC      R1
5542 023612 001344      BNE      1$
5543 023614 000205      RTS      R5
5544
5545
5546
5547
5548      .ROUTINE TO CLEAR ALL DRIVE INFO. USED ON START OF
5549      .RESTART IF CALLED CAN BE USED TO CLEAR INDIVIDUAL DRIVE
5550      .INFO BY BITMAP FOLLOWING CALL
5551      CALL JSR R5, CLEAR
5552
5553
5554
5555 023616 010446      CLEAR   MOV      R4, -(SP)      .SAVE R4
5556 023620 012704 024752      MOV      #DRBUF, R4      .GET BUFFER STARTS
5557 023624 005024      2$      CLR      (R4)+      .CLEAR
5558 023626 020427 026172      CMP      R4, #ENDBUF      .AT END OF BUFFERS
5559 023632 001374      BNE      2$      .NO. GO TO 2$
5560 023634 012604      4$      MOV      (SP)+, P4      .RESTORE CURRENT BUFFER POINTER
5561 023636 000205      RTS      R5      .EXIT
5562
5563      SBTTL ROUTINE TO CHECK FOR BAD SECTOR
5564
5565      .ROUTINE TO MATCH BAD SECTOR BDA(R4) IS SECTOR WE ARE LOOKING
5566      .FOR IN LIST POINTED TO BY BSECT(R4) HDPFND IS SET IF WE FIND IT
5567
5568
5569
5570 023640 005037 002154      CKBDSC CLR      HDPFND      .CLEAR FLAG
5571 023644 010046      MOV      R0, -(SP)      .SAVE R0
5572 023646 010146      MOV      R1, -(SP)      .SAVE R1
5573 023650 010246      MOV      R2, -(SP)      .SAVE R2
5574 023652 010346      MOV      R3, -(SP)      .SAVE R3
5575 023654 012700 000020      MOV      #16, R0      .16 ENTRIES
5576 023660 016402 000112      1$      MOV      BSECT(R4), P2      .GET WHERE WE'RE LOOKING
5577 023664 005712      2$      TST      (R2)      .END
5578 023666 100411      BMI      4$
5579 023670 023712 002156      CMP      CHKSEC (R2)      HAVE WE GOT A MATCH

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|      |        |        |  |  |     |       |                               |
|------|--------|--------|--|--|-----|-------|-------------------------------|
| 5580 | 023674 | 001404 |  |  | BEQ | 3\$   | . THEN GO SET INDICATOR, ELSE |
| 5581 | 023676 | 005722 |  |  | TST | (R2)+ |                               |
| 5582 | 023700 | 005300 |  |  | DEC | R0    |                               |
| 5583 | 023702 | 001370 |  |  | BNE | 2\$   |                               |
| 5584 | 023704 | 000402 |  |  | BR  | 4\$   |                               |

|      |        |        |        |     |     |           |                  |
|------|--------|--------|--------|-----|-----|-----------|------------------|
| 5585 |        |        |        |     |     |           |                  |
| 5586 | 023706 | 005237 | 002154 | 3\$ | INC | HDRFND    | . SET FLAG FOUND |
| 5587 |        |        |        |     |     |           |                  |
| 5588 | 023712 | 012603 |        | 4\$ | MOV | (SP)+, R3 |                  |
| 5589 | 023714 | 012602 |        |     | MOV | (SP)+, R2 |                  |
| 5590 | 023716 | 012601 |        |     | MOV | (SP)+, R1 |                  |
| 5591 | 023720 | 012600 |        |     | MOV | (SP)+, R0 |                  |
| 5592 | 023722 | 000205 |        |     | RTS | R5        |                  |

. BUFFER TO STORE BAD SECTOR LISTS

|      |        |        |  |  |        |        |    |
|------|--------|--------|--|--|--------|--------|----|
| 5593 |        |        |  |  |        |        |    |
| 5594 |        |        |  |  |        |        |    |
| 5595 |        |        |  |  |        |        |    |
| 5596 |        |        |  |  |        |        |    |
| 5597 | 023724 | 000020 |  |  | BSECO  | . BLKW | 16 |
| 5598 | 023764 | 000020 |  |  | BSEC1  | . BLKW | 16 |
| 5599 | 024024 | 000020 |  |  | BSEC2: | . BLKW | 16 |
| 5600 | 024064 | 000020 |  |  | BSEC3: | . BLKW | 16 |
| 5601 | 024124 | 000020 |  |  | BSEC4: | . BLKW | 16 |
| 5602 | 024164 | 000020 |  |  | BSEC5  | . BLKW | 16 |
| 5603 | 024224 | 000020 |  |  | BSEC6  | . BLKW | 16 |
| 5604 | 024264 | 000020 |  |  | BSEC7  | . BLKW | 16 |

LIST OF PATTERNS USED IN WRITING

|      |        |        |  |  |        |      |        |
|------|--------|--------|--|--|--------|------|--------|
| 5605 |        |        |  |  |        |      |        |
| 5606 |        |        |  |  |        |      |        |
| 5607 |        |        |  |  |        |      |        |
| 5608 | 024324 | 024344 |  |  | PATLST | PAT0 |        |
| 5609 | 024326 | 024404 |  |  |        | PAT1 |        |
| 5610 | 024330 | 024444 |  |  |        | PAT2 |        |
| 5611 | 024332 | 024504 |  |  |        | PAT3 |        |
| 5612 | 024334 | 024544 |  |  |        | PAT4 |        |
| 5613 | 024336 | 024604 |  |  |        | PAT5 |        |
| 5614 | 024340 | 024644 |  |  |        | PAT6 |        |
| 5615 | 024342 | 024704 |  |  |        | PAT7 |        |
| 5616 |        |        |  |  |        |      |        |
| 5617 | 024344 | 000000 |  |  | PAT0   | WORD | 0      |
| 5618 | 024346 | 000000 |  |  |        | WORD | 0      |
| 5619 | 024350 | 000000 |  |  |        | WORD | 0      |
| 5620 | 024352 | 000000 |  |  |        | WORD | 0      |
| 5621 | 024354 | 000000 |  |  |        | WORD | 0      |
| 5622 | 024356 | 000000 |  |  |        | WORD | 0      |
| 5623 | 024360 | 000000 |  |  |        | WORD | 0      |
| 5624 | 024362 | 000000 |  |  |        | WORD | 0      |
| 5625 | 024364 | 000000 |  |  |        | WORD | 0      |
| 5626 | 024366 | 000000 |  |  |        | WORD | 0      |
| 5627 | 024370 | 000000 |  |  |        | WORD | 0      |
| 5628 | 024372 | 000000 |  |  |        | WORD | 0      |
| 5629 | 024374 | 000000 |  |  |        | WORD | 0      |
| 5630 | 024376 | 000000 |  |  |        | WORD | 0      |
| 5631 | 024400 | 000000 |  |  |        | WORD | 0      |
| 5632 | 024402 | 000000 |  |  |        | WORD | 0      |
| 5633 |        |        |  |  |        |      |        |
| 5634 | 024404 | 177777 |  |  | PAT1   | WORD | 177777 |
| 5635 | 024406 | 177777 |  |  |        | WORD | 177777 |

|      |        |        |           |        |
|------|--------|--------|-----------|--------|
| 5636 | 024410 | 177777 | WORD      | 177777 |
| 5637 | 024412 | 052525 | WORD      | 052525 |
| 5638 | 024414 | 052525 | WORD      | 052525 |
| 5639 | 024416 | 052525 | WORD      | 052525 |
| 5640 | 024420 | 177777 | WORD      | 177777 |
| 5641 | 024422 | 177777 | WORD      | 177777 |
| 5642 | 024424 | 052525 | WORD      | 052525 |
| 5643 | 024426 | 052525 | WORD      | 052525 |
| 5644 | 024430 | 177777 | WORD      | 177777 |
| 5645 | 024432 | 052525 | WORD      | 052525 |
| 5646 | 024434 | 177252 | WORD      | 177252 |
| 5647 | 024436 | 177252 | WORD      | 177252 |
| 5648 | 024440 | 172765 | WORD      | 172765 |
| 5649 | 024442 | 172765 | WORD      | 172765 |
| 5650 |        |        |           |        |
| 5651 | 024444 | 000000 | PAT2 WORD | 0      |
| 5652 | 024446 | 000000 | WORD      | 0      |
| 5653 | 024450 | 000000 | WORD      | 0      |
| 5654 | 024452 | 177777 | WORD      | 177777 |
| 5655 | 024454 | 177777 | WORD      | 177777 |
| 5656 | 024456 | 177777 | WORD      | 177777 |
| 5657 | 024460 | 000000 | WORD      | 0      |
| 5658 | 024462 | 000000 | WORD      | 0      |
| 5659 | 024464 | 177777 | WORD      | 177777 |
| 5660 | 024466 | 177777 | WORD      | 177777 |
| 5661 | 024470 | 000000 | WORD      | 0      |
| 5662 | 024472 | 177777 | WORD      | 177777 |
| 5663 | 024474 | 000000 | WORD      | 0      |
| 5664 | 024476 | 177777 | WORD      | 177777 |
| 5665 | 024500 | 000000 | WORD      | 0      |
| 5666 | 024502 | 177777 | WORD      | 177777 |
| 5667 |        |        |           |        |
| 5668 | 024504 | 025252 | PAT3 WORD | 25252  |
| 5669 | 024506 | 052525 | WORD      | 52525  |
| 5670 | 024510 | 052525 | WORD      | 52525  |
| 5671 | 024512 | 125252 | WORD      | 125252 |
| 5672 | 024514 | 125252 | WORD      | 125252 |
| 5673 | 024516 | 125252 | WORD      | 125252 |
| 5674 | 024520 | 052525 | WORD      | 52525  |
| 5675 | 024522 | 052525 | WORD      | 52525  |
| 5676 | 024524 | 125252 | WORD      | 125252 |
| 5677 | 024526 | 125252 | WORD      | 125252 |
| 5678 | 024530 | 052525 | WORD      | 52525  |
| 5679 | 024532 | 125252 | WORD      | 125252 |
| 5680 | 024534 | 052525 | WORD      | 52525  |
| 5681 | 024536 | 125252 | WORD      | 125252 |
| 5682 | 024540 | 052525 | WORD      | 52525  |
| 5683 | 024542 | 125252 | WORD      | 125252 |
| 5684 |        |        |           |        |
| 5685 | 024544 | 155555 | PAT4 WORD | 155555 |
| 5686 | 024546 | 133333 | WORD      | 133333 |
| 5687 | 024550 | 066666 | WORD      | 066666 |
| 5688 | 024552 | 155555 | WORD      | 155555 |
| 5689 | 024554 | 133333 | WORD      | 133333 |
| 5690 | 024556 | 066666 | WORD      | 066666 |
| 5691 | 024560 | 155555 | WORD      | 155555 |

|      |        |        |           |        |
|------|--------|--------|-----------|--------|
| 5692 | 024562 | 133333 | WORD      | 133333 |
| 5693 | 024564 | 066666 | WORD      | 066666 |
| 5694 | 024566 | 155555 | WORD      | 155555 |
| 5695 | 024570 | 133333 | WORD      | 133333 |
| 5696 | 024572 | 066666 | WORD      | 066666 |
| 5697 | 024574 | 155555 | WORD      | 155555 |
| 5698 | 024576 | 133333 | WORD      | 133333 |
| 5699 | 024600 | 066666 | WORD      | 066666 |
| 5700 | 024602 | 155555 | WORD      | 155555 |
| 5701 |        |        |           |        |
| 5702 | 024604 | 121105 | FAT5 WORD | 121105 |
| 5703 | 024606 | 150442 | WORD      | 150442 |
| 5704 | 024610 | 064221 | WORD      | 64221  |
| 5705 | 024612 | 132110 | WORD      | 132110 |
| 5706 | 024614 | 055044 | WORD      | 55044  |
| 5707 | 024616 | 026422 | WORD      | 26422  |
| 5708 | 024620 | 013211 | WORD      | 13211  |
| 5709 | 024622 | 105504 | WORD      | 105504 |
| 5710 | 024624 | 042642 | WORD      | 42642  |
| 5711 | 024626 | 021321 | WORD      | 21321  |
| 5712 | 024630 | 110550 | WORD      | 110550 |
| 5713 | 024632 | 044264 | WORD      | 44264  |
| 5714 | 024634 | 022132 | WORD      | 22132  |
| 5715 | 024636 | 011055 | WORD      | 11055  |
| 5716 | 024640 | 104426 | WORD      | 104426 |
| 5717 | 024642 | 042213 | WORD      | 42213  |
| 5718 |        |        |           |        |
| 5719 | 024644 | 177777 | FAT6 WORD | 177777 |
| 5720 | 024646 | 177777 | WORD      | 177777 |
| 5721 | 024650 | 177777 | WORD      | 177777 |
| 5722 | 024652 | 177777 | WORD      | 177777 |
| 5723 | 024654 | 177777 | WORD      | 177777 |
| 5724 | 024656 | 177777 | WORD      | 177777 |
| 5725 | 024660 | 177777 | WORD      | 177777 |
| 5726 | 024662 | 177777 | WORD      | 177777 |
| 5727 | 024664 | 177777 | WORD      | 177777 |
| 5728 | 024666 | 177777 | WORD      | 177777 |
| 5729 | 024670 | 177777 | WORD      | 177777 |
| 5730 | 024672 | 177777 | WORD      | 177777 |
| 5731 | 024674 | 177777 | WORD      | 177777 |
| 5732 | 024676 | 177777 | WORD      | 177777 |
| 5733 | 024700 | 177777 | WORD      | 177777 |
| 5734 | 024702 | 177777 | WORD      | 177777 |
| 5735 |        |        |           |        |
| 5736 | 024704 | 045513 | FAT7 WORD | 45513  |
| 5737 | 024706 | 122645 | WORD      | 122645 |
| 5738 | 024710 | 151322 | WORD      | 151322 |
| 5739 | 024712 | 064551 | WORD      | 64551  |
| 5740 | 024714 | 132264 | WORD      | 132264 |
| 5741 | 024716 | 055132 | WORD      | 55132  |
| 5742 | 024720 | 026455 | WORD      | 26455  |
| 5743 | 024722 | 113226 | WORD      | 113226 |
| 5744 | 024724 | 045513 | WORD      | 45513  |
| 5745 | 024726 | 122645 | WORD      | 122645 |
| 5746 | 024730 | 151322 | WORD      | 151322 |
| 5747 | 024732 | 064551 | WORD      | 64551  |

5748 024734 132264 WORD 132264  
 5749 024736 055132 WORD 55132  
 5750 024740 026455 WORD 26455  
 5751 024742 113226 WORD 113226

5752  
 5753  
 5754  
 5755 024744 000240 ENDOFPROGRAM NOP  
 5756 024746 ENDTST  
 (3) 024746 L10022  
 (3) 024746 104001 EMT CSETST  
 5757 024750 000000 HALT

5758  
 5759 SBTTL DRIVE INFORMATION BUFFERS  
 5760  
 5761 .DRIVE INFORMATION BUFFER

5762  
 5763  
 5764 .LIST ME

5765  
 5766 024752 DRBUF

5811  
 (1) 024752 000000 SKCNT .SEEK OPERATION COUNT  
 (1) 024754 000002 PXFR1 .READ OPERATION COUNT (BITS) LOW ORDER  
 (1) 024756 000004 RXFR2 . " " " " HIGH ORDER  
 (1) 024760 000006 WXFR1 .WRITE OPERATION COUNT (BITS) LOW ORDER  
 (1) 024762 000010 WXFR2 . " " " " HIGH ORDER  
 (1) 024764 000012 ERRCNT .ERROR COUNT - HARD  
 (1) 024766 000014 SFTCNT .ERROR COUNT - SOFT  
 (1) 024770 000016 SKECNT .SEEK ERROR COUNT  
 (1) 024772 000020 DERCNT .DRIVE ERROR COUNT  
 (1) 024774 000022 DCRCER .DATA CRC ERROR COUNT  
 (1) 024776 000024 HCRCER .HEADER CRC ERROR COUNT  
 (1) 025000 000026 DLTCNT .DATA LATE ERROR COUNT  
 (1) 025002 000030 OPICNT .OPERATION INCOMPLETE ERROR COUNT  
 (1) 025004 000032 HNFERR .HEADER NOT FOUND ERROR COUNT  
 (1) 025006 000034 NXMCNT .NON EXISTANT MEMORY ERROR COUNT  
 (1) 025010 000036 RETRY .PRESENT RETRY NUMBER  
 (1) 025012 000040 BDA . " DISK ADDRESS CONTENTS  
 (1) 025014 000042 BMP .PRESENT MULTIPURPOSE CONTENTS  
 (1) 025016 000044 FUNC .LAST FUNCTION LOADED  
 (1) 025020 000046 BCSADR .CSR IMAGE OF LAST COMMAND  
 (1) 025022 000050 LSTHDR .LAST POSITION ON DISK  
 (1) 025024 000052 RTYPE .ERROR ON WHICH RECOVERY IS IN PROGRESS  
 (1) 025026 000054 SKCNT1 .SEEK COUNT LOW ORDER  
 (1) 025030 000056 PRFLGS .PROGRAM INTERNAL FLAGS  
 (1) 025032 000060 RXFR3 .READ COUNT THIRD  
 (1) 025034 000062 WXFR3 .WRITE COUNT THIRD  
 (1) 025036 000064 LSTDA .DISK ADDRESS OF SOFT ERROR  
 (1) 025040 000066 DIFWD .LAST DIFFERENCE WORD OF SEEN  
 (1) 025042 000070 DPHOUR .TIME DRIVE WAS DROPPED  
 (1) 025044 000072 TRERR .TRACKING ERROR COUNT  
 (1) 025046 000074 DATCER  
 (1) 025050 000076 DOWCK .WRITE CHECK NECESSARY  
 (1) 025052 000100 SEPNM1 .SERIAL NUMBER OF CARTRIDGE  
 (1) 025054 000102 SERNM2 .SERIAL NUMBER OF CARTRIDGE

|     |        |        |        |  |
|-----|--------|--------|--------|--|
| (1) | 025056 | 000104 | DCS    | . CSR ADDRESS                            |
| (1) | 025060 | 000106 | DRSEL  | . DRIVE SELECT BITS(8,9,10)              |
| (1) | 025062 | 000110 | BBA    | . PRESENT BUS ADDRESS CONTENTS           |
| (1) | 025064 | 000112 | BSECPT | . POINTER TO BAD SECTOR FILE             |
| (1) | 025066 | 000114 | RSEEK  |  |
| (1) | 025070 | 000116 | SOFTCS | . CSR AT TIME OF SOFT ERROR              |
| (1) | 025072 | 000120 | PRPOS  | . PRESENT POSITION ON DISK               |
| (1) |        |        |        |  |
| (1) |        |        |        |  |
| (1) | 025074 | 000000 | SKCNT  | . SEEK OPERATION COUNT                   |
| (1) | 025076 | 000002 | RXFR1  | . READ OPERATION COUNT (BITS) LOW ORDER  |
| (1) | 025100 | 000004 | RXFR2  | " " " " HIGH ORDER                       |
| (1) | 025102 | 000006 | WXFR1  | . WRITE OPERATION COUNT (BITS) LOW ORDER |
| (1) | 025104 | 000010 | WXFR2  | " " " " HIGH ORDER                       |
| (1) | 025106 | 000012 | ERRCNT | . ERROR COUNT - HARD                     |
| (1) | 025110 | 000014 | SFTCNT | . ERROR COUNT - SOFT                     |
| (1) | 025112 | 000016 | SKECNT | . SEEK ERROR COUNT                       |
| (1) | 025114 | 000020 | DERCNT | . DRIVE ERROR COUNT                      |
| (1) | 025116 | 000022 | DCRCER | . DATA CRC ERROR COUNT                   |
| (1) | 025120 | 000024 | HRCRCR | . HEADER CRC ERROR COUNT                 |
| (1) | 025122 | 000026 | DLTCNT | . DATA LATE ERROR COUNT                  |
| (1) | 025124 | 000030 | OPICNT | . OPERATION INCOMPLETE ERROR COUNT       |
| (1) | 025126 | 000032 | HNFERR | . HEADER NOT FOUND ERROR COUNT           |
| (1) | 025130 | 000034 | NXMCNT | . NON EXISTANT MEMORY ERROR COUNT        |
| (1) | 025132 | 000036 | RETRY  | . PRESENT RETRY NUMBER                   |
| (1) | 025134 | 000040 | BDA    | " DISK ADDRESS CONTENTS                  |
| (1) | 025136 | 000042 | BMP    | . PRESENT MULTIPURPOSE CONTENTS          |
| (1) | 025140 | 000044 | FUNC   | . LAST FUNCT ON LOADED                   |
| (1) | 025142 | 000046 | BCSADR | . CSR IMAGE OF LAST COMMAND              |
| (1) | 025144 | 000050 | LSTHDP | . LAST POSITION ON DISK                  |
| (1) | 025146 | 000052 | RTYPE  | . ERROR ON WHICH RECOVERY IS IN PROGRESS |
| (1) | 025150 | 000054 | SKCNT1 | . SEEK COUNT LOW ORDER                   |
| (1) | 025152 | 000056 | PRFLGS | . PROGRAM INTERNAL FLAGS                 |
| (1) | 025154 | 000060 | RXFR3  | . READ COUNT THIRD                       |
| (1) | 025156 | 000062 | WXFR3  | . WRITE COUNT THIRD                      |
| (1) | 025160 | 000064 | LSTDA  | . DISK ADDRESS OF SOFT ERROR             |
| (1) | 025162 | 000066 | DIFWD  | . LAST DIFFERENCE WORD OF SEEK           |
| (1) | 025164 | 000070 | DPHOUR | . TIME DRIVE WAS DROPPED                 |
| (1) | 025166 | 000072 | TRERR  | . TRACKING ERROR COUNT                   |
| (1) | 025170 | 000074 | DATCER |  |
| (1) | 025172 | 000076 | DOWCN  | . WRITE CHECK NECESSARY                  |
| (1) | 025174 | 000100 | SERNM1 | . SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025176 | 000102 | SERNM2 | . SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025200 | 000104 | DCS    | . CSR ADDRESS                            |
| (1) | 025202 | 000106 | DRSEL  | . DRIVE SELECT BITS(8,9,10)              |
| (1) | 025204 | 000110 | BBA    | . PRESENT BUS ADDRESS CONTENTS           |
| (1) | 025206 | 000112 | BSECPT | . POINTER TO BAD SECTOR FILE             |
| (1) | 025210 | 000114 | RSEEK  |  |
| (1) | 025212 | 000116 | SOFTCS | . CSR AT TIME OF SOFT ERROR              |
| (1) | 025214 | 000120 | PRPOS  | . PRESENT POSITION ON DISK               |
| (1) |        |        |        |  |
| (1) |        |        |        |  |
| (1) | 025216 | 000000 | SKCNT  | . SEEK OPERATION COUNT                   |
| (1) | 025220 | 000002 | RXFR1  | . READ OPERATION COUNT (BITS) LOW ORDER  |
| (1) | 025222 | 000004 | RXFR2  | " " " " HIGH ORDER                       |
| (1) | 025224 | 000006 | WXFR1  | . WRITE OPERATION COUNT (BITS) LOW ORDER |

|     |        |        |        |  |
|-----|--------|--------|--------|--|
| (1) | 025226 | 000010 | WXFR2  | " " " " HIGH ORDER                     |
| (1) | 025230 | 000012 | ERRCNT | ERROR COUNT - HARD                     |
| (1) | 025232 | 000014 | SFTCNT | ERROR COUNT - SOFT                     |
| (1) | 025234 | 000016 | SKECNT | SEEK ERROR COUNT                       |
| (1) | 025236 | 000020 | DERCNT | DRIVE ERROR COUNT                      |
| (1) | 025240 | 000022 | DCRCER | DATA CRC ERROR COUNT                   |
| (1) | 025242 | 000024 | HRCRCR | HEADER CRC ERROR COUNT                 |
| (1) | 025244 | 000026 | DLTCNT | DATA LATE ERROR COUNT                  |
| (1) | 025246 | 000030 | OPICNT | OPERATION INCOMPLETE ERROR COUNT       |
| (1) | 025250 | 000032 | HNFERR | HEADER NOT FOUND ERROR COUNT           |
| (1) | 025252 | 000034 | NXMCNT | NON EXISTANT MEMORY ERROR COUNT        |
| (1) | 025254 | 000036 | RETRY  | PRESENT RETRY NUMBER                   |
| (1) | 025256 | 000040 | BDA    | " DISK ADDRESS CONTENTS                |
| (1) | 025260 | 000042 | BMP    | PRESENT MULTIPURPOSE CONTENTS          |
| (1) | 025262 | 000044 | FUNC   | LAST FUNCTION LOADED                   |
| (1) | 025264 | 000046 | BCSADR | CSR IMAGE OF LAST COMMAND              |
| (1) | 025266 | 000050 | LSTHDR | LAST POSITION ON DISK                  |
| (1) | 025270 | 000052 | RTYPE  | ERROR ON WHICH RECOVERY IS IN PROGRESS |
| (1) | 025272 | 000054 | SKCNT1 | SEEK COUNT LOW ORDER                   |
| (1) | 025274 | 000056 | PRFLGS | PROGRAM INTERNAL FLAGS                 |
| (1) | 025276 | 000060 | RXFR3  | READ COUNT THIRD                       |
| (1) | 025300 | 000062 | WXFR3  | WRITE COUNT THIRD                      |
| (1) | 025302 | 000064 | LSTDA  | DISK ADDRESS OF SOFT ERROR             |
| (1) | 025304 | 000066 | DIFWD  | LAST DIFFERENCE WORD OF SEEK           |
| (1) | 025306 | 000070 | DPHOUR | TIME DRIVE WAS DROPPED                 |
| (1) | 025310 | 000072 | TRERR  | TRACKING ERROR COUNT                   |
| (1) | 025312 | 000074 | DATCER |  |
| (1) | 025314 | 000076 | DOWCN  | WRITE CHECK NECESSARY                  |
| (1) | 025316 | 000100 | SERNM1 | SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025320 | 000102 | SERNM2 | SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025322 | 000104 | DCS    | CSR ADDRESS                            |
| (1) | 025324 | 000106 | CRSEL  | DRIVE SELECT BITS(8,9,10)              |
| (1) | 025326 | 000110 | BBA    | PRESENT BUS ADDRESS CONTENTS           |
| (1) | 025330 | 000112 | BSECPT | POINTER TO BAD SECTOR FILE             |
| (1) | 025332 | 000114 | RSEK   |  |
| (1) | 025334 | 000116 | SOFTCS | CSR AT TIME OF SOFT ERROR              |
| (1) | 025336 | 000120 | PPPOS  | PRESENT POSITION ON DISK               |
| (1) |        |        |        |  |
| (1) |        |        |        |  |
| (1) | 025340 | 000000 | SKCNT  | SEEK OPERATION COUNT                   |
| (1) | 025342 | 000002 | RXFR1  | READ OPERATION COUNT (BITS) LOW ORDER  |
| (1) | 025344 | 000004 | PXFR2  | " " " " HIGH ORDER                     |
| (1) | 025346 | 000006 | WXFR1  | WRITE OPERATION COUNT (BITS) LOW ORDER |
| (1) | 025350 | 000010 | WXFR2  | " " " " HIGH ORDER                     |
| (1) | 025352 | 000012 | ERRCNT | ERROR COUNT - HARD                     |
| (1) | 025354 | 000014 | SFTCNT | ERROR COUNT - SOFT                     |
| (1) | 025356 | 000016 | SKECNT | SEEK ERROR COUNT                       |
| (1) | 025360 | 000020 | DERCNT | DRIVE ERROR COUNT                      |
| (1) | 025362 | 000022 | DCRCER | DATA CRC ERROR COUNT                   |
| (1) | 025364 | 000024 | HRCRCR | HEADER CRC ERROR COUNT                 |
| (1) | 025366 | 000026 | DLTCNT | DATA LATE ERROR COUNT                  |
| (1) | 025370 | 000030 | OPICNT | OPERATION INCOMPLETE ERROR COUNT       |
| (1) | 025372 | 000032 | HNFERR | HEADER NOT FOUND ERROR COUNT           |
| (1) | 025374 | 000034 | NXMCNT | NON EXISTANT MEMORY ERROR COUNT        |
| (1) | 025376 | 000036 | RETRY  | PRESENT RETRY NUMBER                   |
| (1) | 025400 | 000040 | BDA    | " DISK ADDRESS CONTENTS                |

|     |        |        |        |   |
|-----|--------|--------|--------|---|
| (1) | 025402 | 000042 | BMP    | .PRESENT MULTIPURPOSE CONTENTS          |
| (1) | 025404 | 000044 | FUNC   | .LAST FUNCTION LOADED                   |
| (1) | 025406 | 000046 | BCSADR | .CSR IMAGE OF LAST COMMAND              |
| (1) | 025410 | 000050 | LSTHDR | .LAST POSITION ON DISK                  |
| (1) | 025412 | 000052 | RTYPE  | .ERROR ON WHICH RECOVERY IS IN PROGRESS |
| (1) | 025414 | 000054 | SKCNT1 | .SEEK COUNT LOW ORDER                   |
| (1) | 025416 | 000056 | PRFLGS | .PROGRAM INTERNAL FLAGS                 |
| (1) | 025420 | 000060 | RXFR3  | .READ COUNT THIRD                       |
| (1) | 025422 | 000062 | WXFR3  | .WRITE COUNT THIRD                      |
| (1) | 025424 | 000064 | LSTDA  | .DISK ADDRESS OF SOFT ERROR             |
| (1) | 025426 | 000066 | DIFWD  | .LAST DIFFERENCE WORD OF SEEK           |
| (1) | 025430 | 000070 | DPHOUR | .TIME DRIVE WAS DROPPED                 |
| (1) | 025432 | 000072 | TRERR  | .TRACKING ERROR COUNT                   |
| (1) | 025434 | 000074 | DATCER |   |
| (1) | 025436 | 000076 | DOWCK  | .WRITE CHECK NECESSARY                  |
| (1) | 025440 | 000100 | SERNM1 | .SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025442 | 000102 | SERNM2 | .SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025444 | 000104 | DCS    | .CSR ADDRESS                            |
| (1) | 025446 | 000106 | DRSEL  | .DRIVE SELECT BITS(8,9,10)              |
| (1) | 025450 | 000110 | BBA    | .PRESENT BUS ADDRESS CONTENTS           |
| (1) | 025452 | 000112 | BSECTP | .POINTER TO BAD SECTOR FILE             |
| (1) | 025454 | 000114 | RSEEK  |   |
| (1) | 025456 | 000116 | SOFTCS | .CSR AT TIME OF SOFT ERROR              |
| (1) | 025460 | 000120 | PRPOS  | .PRESENT POSITION ON DISK               |
| (1) |        |        |        |   |
| (1) | 025462 | 000000 | SKCNT  | .SEEK OPERATION COUNT                   |
| (1) | 025464 | 000002 | RXFR1  | .READ OPERATION COUNT (BITS) LOW ORDER  |
| (1) | 025466 | 000004 | RXFR2  | . " " " " HIGH ORDER                    |
| (1) | 025470 | 000006 | WXFR1  | .WRITE OPERATION COUNT (BITS) LOW ORDER |
| (1) | 025472 | 000010 | WXFR2  | . " " " " HIGH ORDER                    |
| (1) | 025474 | 000012 | ERPCNT | .ERROR COUNT - HARD                     |
| (1) | 025476 | 000014 | SFTCNT | .ERROR COUNT - SOFT                     |
| (1) | 025500 | 000016 | SKECNT | .SEEK ERROR COUNT                       |
| (1) | 025502 | 000020 | DERCNT | .DRIVE ERROR COUNT                      |
| (1) | 025504 | 000022 | DCRCER | .DATA CRC ERROR COUNT                   |
| (1) | 025506 | 000024 | HRCRCR | .HEADER CRC ERROR COUNT                 |
| (1) | 025510 | 000026 | DLTCNT | .DATA LATE ERROR COUNT                  |
| (1) | 025512 | 000030 | OPICNT | .OPERATION INCOMPLETE ERROR COUNT       |
| (1) | 025514 | 000032 | HNFERR | .HEADER NOT FOUND ERROR COUNT           |
| (1) | 025516 | 000034 | NXMCNT | .NON EXISTANT MEMORY ERROR COUNT        |
| (1) | 025520 | 000036 | RETRY  | .PRESENT RETRY NUMBER                   |
| (1) | 025522 | 000040 | BDA    | . " DISK ADDRESS CONTENTS               |
| (1) | 025524 | 000042 | BMP    | .PRESENT MULTIPURPOSE CONTENTS          |
| (1) | 025526 | 000044 | FUNC   | .LAST FUNCTION LOADED                   |
| (1) | 025530 | 000046 | BCSADR | .CSR IMAGE OF LAST COMMAND              |
| (1) | 025532 | 000050 | LSTHDR | .LAST POSITION ON DISK                  |
| (1) | 025534 | 000052 | RTYPE  | .ERROR ON WHICH RECOVERY IS IN PROGRESS |
| (1) | 025536 | 000054 | SKCNT1 | .SEEK COUNT LOW ORDER                   |
| (1) | 025540 | 000056 | PRFLGS | .PROGRAM INTERNAL FLAGS                 |
| (1) | 025542 | 000060 | RXFR3  | .READ COUNT THIRD                       |
| (1) | 025544 | 000062 | WXFR3  | .WRITE COUNT THIRD                      |
| (1) | 025546 | 000064 | LSTDA  | .DISK ADDRESS OF SOFT ERROR             |
| (1) | 025550 | 000066 | DIFWD  | .LAST DIFFERENCE WORD OF SEEK           |
| (1) | 025552 | 000070 | DPHOUR | .TIME DRIVE WAS DROPPED                 |
| (1) | 025554 | 000072 | TRERP  | .TRACKING ERROR COUNT                   |

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|-----|--------|--------|--------|---|
| (1) | 025556 | 000074 | DATCER |   |
| (1) | 025560 | 000076 | DOWCK  | ,WRITE CHECK NECESSARY                  |
| (1) | 025562 | 000100 | SERNM1 | ,SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025564 | 000102 | SERNM2 | ,SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025566 | 000104 | DCS    | ,CSR ADDRESS                            |
| (1) | 025570 | 000106 | DRSEL  | ,DRIVE SELECT BITS(8,9,10)              |
| (1) | 025572 | 000110 | BBA    | ,PRESENT BUS ADDRESS CONTENTS           |
| (1) | 025574 | 000112 | BSECPT | ,PCINTER TO BAD SECTOR FILE             |
| (1) | 025576 | 000114 | RSEEK  |   |
| (1) | 025600 | 000116 | SOFTCS | ,CSR AT TIME OF SOFT ERROR              |
| (1) | 025602 | 000120 | PRPOS  | ,PRESENT POSITION ON DISK               |
| (1) |        |        |        |   |
| (1) |        |        |        |   |
| (1) | 025604 | 000000 | SKCNT  | ,SEEK OPERATION COUNT                   |
| (1) | 025606 | 000002 | RYFR1  | ,READ OPERATION COUNT (BITS) LOW ORDER  |
| (1) | 025610 | 000004 | RXFR2  | , " " " " HIGH ORDER                    |
| (1) | 025612 | 000006 | WXFR1  | ,WRITE OPERATION COUNT (BITS) LOW ORDER |
| (1) | 025614 | 000010 | WXFR2  | , " " " " HIGH ORDER                    |
| (1) | 025616 | 000012 | ERRCNT | ,ERROR COUNT - HARD                     |
| (1) | 025620 | 000014 | SFTCNT | ,ERROR COUNT - SOFT                     |
| (1) | 025622 | 000016 | SKECNT | ,SEEK ERROR COUNT                       |
| (1) | 025624 | 000020 | DERCNT | ,DRIVE ERROR COUNT                      |
| (1) | 025626 | 000022 | DCRCER | ,DATA CRC ERROR COUNT                   |
| (1) | 025630 | 000024 | HCRCER | ,HEADER CRC ERROR COUNT                 |
| (1) | 025632 | 000026 | DLTCNT | ,DATA LATE ERROR COUNT                  |
| (1) | 025634 | 000030 | OPICNT | ,OPERATION INCOMPLETE ERROR COUNT       |
| (1) | 025636 | 000032 | HNFERR | ,HEADER NOT FOUND ERROR COUNT           |
| (1) | 025640 | 000034 | NXMCNT | ,NON EXISTANT MEMORY ERROR COUNT        |
| (1) | 025642 | 000036 | RETRY  | ,PRESENT RETRY NUMBER                   |
| (1) | 025644 | 000040 | BDA    | , " DISK ADDRESS CONTENTS               |
| (1) | 025646 | 000042 | BMP    | ,PRESENT MULTIPURPOSE CONTENTS          |
| (1) | 025650 | 000044 | FUNC   | ,LAST FUNCTION LOADED                   |
| (1) | 025652 | 000046 | BCSADR | ,CSR IMAGE OF LAST COMMAND              |
| (1) | 025654 | 000050 | LSTHDR | ,LAST POSITION ON DISK                  |
| (1) | 025656 | 000052 | RTYPE  | ,ERROR ON WHICH RECOVERY IS IN PROGRESS |
| (1) | 025660 | 000054 | SKCNT1 | ,SEEK COUNT LOW ORDER                   |
| (1) | 025662 | 000056 | PRFLGS | ,PROGRAM INTERNAL FLAGS                 |
| (1) | 025664 | 000060 | RXFR3  | ,READ COUNT THIRD                       |
| (1) | 025666 | 000062 | WXFR3  | ,WRITE COUNT THIRD                      |
| (1) | 025670 | 000064 | LSTDA  | ,DISK ADDRESS OF SOFT ERROR             |
| (1) | 025672 | 000066 | DIFWD  | ,LAST DIFFERENCE WORD OF SEEK           |
| (1) | 025674 | 000070 | DPHOUR | ,TIME DRIVE WAS DROPPED                 |
| (1) | 025676 | 000072 | TRERR  | ,TRACKING ERROR COUNT                   |
| (1) | 025700 | 000074 | DATCER |   |
| (1) | 025702 | 000076 | DOWCK  | ,WRITE CHECK NECESSARY                  |
| (1) | 025704 | 000100 | SERNM1 | ,SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025706 | 000102 | SERNM2 | ,SERIAL NUMBER OF CARTRIDGE             |
| (1) | 025710 | 000104 | DCS    | ,CSR ADDRESS                            |
| (1) | 025712 | 000106 | DRSEL  | ,DRIVE SELECT BITS(8,9,10)              |
| (1) | 025714 | 000110 | BBA    | ,PRESENT BUS ADDRESS CONTENTS           |
| (1) | 025716 | 000112 | BSECPT | ,POINTER TO BAD SECTOR FILE             |
| (1) | 025720 | 000114 | RSEEK  |   |
| (1) | 025722 | 000116 | SOFTCS | ,CSR AT TIME OF SOFT ERROR              |
| (1) | 025724 | 000120 | PRPOS  | ,PRESENT POSITION ON DISK               |
| (1) |        |        |        |   |
| (1) |        |        |        |   |

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|-----|--------|--------|--------|--|
| (1) | 025726 | 000000 | SKCNT  | , SEEK OPERATION COUNT                   |
| (1) | 025730 | 000002 | RXFR1  | , READ OPERATION COUNT (BITS) LOW ORDER  |
| (1) | 025732 | 000004 | RXFR2  | , " " " " HIGH ORDER                     |
| (1) | 025734 | 000006 | WXFR1  | , WRITE OPERATION COUNT (BITS) LOW ORDER |
| (1) | 025736 | 000010 | WXFR2  | , " " " " HIGH ORDER                     |
| (1) | 025740 | 000012 | ERRCNT | , ERROR COUNT - HARD                     |
| (1) | 025742 | 000014 | SFTCNT | , ERROR COUNT - SOFT                     |
| (1) | 025744 | 000016 | SKECNT | , SEEK ERROR COUNT                       |
| (1) | 025746 | 000020 | DERCNT | , DRIVE ERROR COUNT                      |
| (1) | 025750 | 000022 | DCRCER | , DATA CRC ERROR COUNT                   |
| (1) | 025752 | 000024 | HRCRCR | , HEADER CRC ERROR COUNT                 |
| (1) | 025754 | 000026 | DLTCNT | , DATA LATE ERROR COUNT                  |
| (1) | 025756 | 000030 | OPICNT | , OPERATION INCOMPLETE ERROR COUNT       |
| (1) | 025760 | 000032 | HNFERR | , HEADER NOT FOUND ERROR COUNT           |
| (1) | 025762 | 000034 | NVMCNT | , NON EXISTANT MEMORY ERROR COUNT        |
| (1) | 025764 | 000036 | RETRY  | , PRESENT RETRY NUMBER                   |
| (1) | 025766 | 000040 | BDA    | , " DISK ADDRESS CONTENTS                |
| (1) | 025770 | 000042 | BMP    | , PRESENT MULTIPURPOSE CONTENTS          |
| (1) | 025772 | 000044 | FUNC   | , LAST FUNCTION LOADED                   |
| (1) | 025774 | 000046 | BCSADR | , CSR IMAGE OF LAST COMMAND              |
| (1) | 025776 | 000050 | LSTHDR | , LAST POSITION ON DISK                  |
| (1) | 026000 | 000052 | RTYPE  | , ERROR ON WHICH RECOVERY IS IN PROGRESS |
| (1) | 026002 | 000054 | SKCNT1 | , SEEK COUNT LOW ORDER                   |
| (1) | 026004 | 000056 | PRFLGS | , PROGRAM INTERNAL FLAGS                 |
| (1) | 026006 | 000060 | RXFR3  | , READ COUNT THIRD                       |
| (1) | 026010 | 000062 | WXFR3  | , WRITE COUNT THIRD                      |
| (1) | 026012 | 000064 | LSTDA  | , DISK ADDRESS OF SOFT ERROR             |
| (1) | 026014 | 000066 | DIFWD  | , LAST DIFFERENCE WORD OF SEEK           |
| (1) | 026016 | 000070 | DPHOUR | , TIME DRIVE WAS DROPPED                 |
| (1) | 026020 | 000072 | TRERR  | , TRACKING ERROR COUNT                   |
| (1) | 026022 | 000074 | DATCER |  |
| (1) | 026024 | 000076 | DOWCK  | , WRITE CHECK NECESSARY                  |
| (1) | 026026 | 000100 | SERNM1 | , SERIAL NUMBER OF CARTRIDGE             |
| (1) | 026030 | 000102 | SERNM2 | , SERIAL NUMBER OF CARTRIDGE             |
| (1) | 026032 | 000104 | DCS    | , CSR ADDRESS                            |
| (1) | 026034 | 000106 | DRSEL  | , DRIVE SELECT BITS(8,9,10)              |
| (1) | 026036 | 000110 | BBA    | , PRESENT BUS ADDRESS CONTENTS           |
| (1) | 026040 | 000112 | BSECPT | , POINTER TO BAD SECTOR FILE             |
| (1) | 026042 | 000114 | RSEEK  |  |
| (1) | 026044 | 000116 | SOFTCS | , CSR AT TIME OF SOFT ERROR              |
| (1) | 026046 | 000120 | PRPOS  | , PRESENT POSITION ON DISK               |
| (1) |        |        |        |  |
| (1) |        |        |        |  |
| (1) | 026050 | 000000 | SKCNT  | , SEEK OPERATION COUNT                   |
| (1) | 026052 | 000002 | RXFR1  | , READ OPERATION COUNT (BITS) LOW ORDER  |
| (1) | 026054 | 000004 | RXFR2  | , " " " " HIGH ORDER                     |
| (1) | 026056 | 000006 | WXFR1  | , WRITE OPERATION COUNT (BITS) LOW ORDER |
| (1) | 026060 | 000010 | WXFR2  | , " " " " HIGH ORDER                     |
| (1) | 026062 | 000012 | ERRCNT | , ERROR COUNT - HARD                     |
| (1) | 026064 | 000014 | SFTCNT | , ERROR COUNT - SOFT                     |
| (1) | 026066 | 000016 | SKECNT | , SEEK ERROR COUNT                       |
| (1) | 026070 | 000020 | DERCNT | , DRIVE ERROR COUNT                      |
| (1) | 026072 | 000022 | DCRCER | , DATA CRC ERROR COUNT                   |
| (1) | 026074 | 000024 | HRCRCR | , HEADER CRC ERROR COUNT                 |
| (1) | 026076 | 000026 | DLTCNT | , DATA LATE ERROR COUNT                  |
| (1) | 026100 | 000030 | OPICNT | , OPERATION INCOMPLETE ERROR COUNT       |

|      |        |        |        |  |
|------|--------|--------|--------|--|
| (1)  | 026102 | 000032 | HNFERR | , HEADER NOT FOUND ERROR COUNT           |
| (1)  | 026104 | 000034 | NXMCNT | , NON EXISTANT MEMORY ERROR COUNT        |
| (1)  | 026106 | 000036 | RETRY  | , PRESENT RETRY NUMBER                   |
| (1)  | 026110 | 000040 | BDA    | , " DISK ADDRESS CONTENTS                |
| (1)  | 026112 | 000042 | BMP    | , PRESENT MULTIPURPOSE CONTENTS          |
| (1)  | 026114 | 000044 | FUNC   | , LAST FUNCTION LOADED                   |
| (1)  | 026116 | 000046 | BCSADR | , CSR IMAGE OF LAST COMMAND              |
| (1)  | 026120 | 000050 | LSTHDR | , LAST POSITION ON DISK                  |
| (1)  | 026122 | 000052 | RTYPE  | , ERROR ON WHICH RECOVERY IS IN PROGRESS |
| (1)  | 026124 | 000054 | SKCNT1 | , SEEK COUNT LOW ORDER                   |
| (1)  | 026126 | 000056 | PRFLGS | , PROGRAM INTERNAL FLAGS                 |
| (1)  | 026130 | 000060 | RXFR3  | , READ COUNT THIRD                       |
| (1)  | 026132 | 000062 | WXFR3  | , WRITE COUNT THIRD                      |
| (1)  | 026134 | 000064 | LSTDA  | , DISK ADDRESS OF SOFT ERROR             |
| (1)  | 026136 | 000066 | DIFWD  | , LAST DIFFERENCE WORD OF SEEK           |
| (1)  | 026140 | 000070 | DPHOUR | , TIME DRIVE WAS DROPPED                 |
| (1)  | 026142 | 000072 | TRERR  | , TRACKING ERROR COUNT                   |
| (1)  | 026144 | 000074 | DATCER |  |
| (1)  | 026146 | 000076 | DOWCK  | , WRITE CHECK NECESSARY                  |
| (1)  | 026150 | 000100 | SERNM1 | , SERIAL NUMBER OF CARTRIDGE             |
| (1)  | 026152 | 000102 | SERNM2 | , SERIAL NUMBER OF CARTRIDGE             |
| (1)  | 026154 | 000104 | DCS    | , CSR ADDRESS                            |
| (1)  | 026156 | 000106 | DRSEL  | , DRIVE SELECT BITS(8,9,10)              |
| (1)  | 026160 | 000110 | BBA    | , PRESENT BUS ADDRESS CONTENTS           |
| (1)  | 026162 | 000112 | BSECPT | , POINTER TO BAD SECTOR FILE             |
| (1)  | 026164 | 000114 | RSEEK  |  |
| (1)  | 026166 | 000116 | SOFTCS | , CSR AT TIME OF SOFT ERROR              |
| (1)  | 026170 | 000120 | PRPOS  | , PRESENT POSITION ON DISK               |
| (1)  |        |        |        |  |
| 5812 |        |        | NLIST  | ME                                       |
| 5813 |        |        |        |  |
| 5814 | 026172 | 000000 | ENDBUF | WORD 0                                   |
| 5815 |        |        |        |  |
| 5816 |        |        |        |  |
| 5817 | 026174 |        | BGNMOD | HRDPRM                                   |
| 5818 |        |        |        |  |
| 5819 | 026174 |        | BGNHRD |  |
| (3)  | 026174 | 000025 |        | WORD L10024-LSHARD/2                     |
| 5820 |        |        |        |  |
| 5321 | 026176 |        | GPRML  | CNTYPE, CNT, 1, YES                      |
| (4)  | 026176 | 004130 | WORD   | T\$CODE                                  |
| (4)  | 026200 | 026250 | WORD   | CNTYPE                                   |
| (4)  | 026202 | 000001 | WORD   | 1  |
| 5822 | 026204 |        | GPRMA  | CSRMSG, CSR, 0, 160000, 177776, YES      |
| (4)  | 026204 | 000031 | WORD   | T\$CODE                                  |
| (4)  | 026206 | 026255 | WORD   | CSRMSG                                   |
| (4)  | 026210 | 160000 | WORD   | T\$LOLIM                                 |
| (4)  | 026212 | 177776 | WORD   | T\$HILIM                                 |
| 5823 | 026214 |        | GPRMA  | VECMG, VECT, 0, 0, 776, YES              |
| (4)  | 026214 | 001031 | WORD   | T\$CODE                                  |
| (4)  | 026216 | 026302 | WORD   | VECMG                                    |
| (4)  | 026220 | 000000 | WORD   | T\$LOLIM                                 |
| (4)  | 026222 | 000776 | WORD   | T\$HILIM                                 |
| 5824 | 026224 |        | GPRMD  | BRMSG, PRIOR, 0, 340, 0, 7, YES          |
| (4)  | 026224 | 002032 | WORD   | T\$CODE                                  |
| (4)  | 026226 | 026271 | WORD   | BRMSG                                    |

|      |        |        |        |        |        |        |  |
|------|--------|--------|--------|--------|--------|--------|--|
| (4)  | 026230 | 000340 |        |        |        | WORD   | 340                                    |
| (4)  | 026232 | 000000 |        |        |        | WORD   | T\$LOLIM                               |
| (4)  | 026234 | 000007 |        |        |        | WORD   | T\$HILIM                               |
| 5825 | 026236 |        |        |        |        | GPRMD  | DRMSG, DRBT, 0, 03400, 0, 7, YES       |
| (4)  | 026236 | 003032 |        |        |        | WORD   | T\$CODE                                |
| (4)  | 026240 | 026311 |        |        |        | WORD   | DRMSG                                  |
| (4)  | 026242 | 003400 |        |        |        | WORD   | 03400                                  |
| (4)  | 026244 | 000000 |        |        |        | WORD   | T\$LOLIM                               |
| (4)  | 026246 | 000007 |        |        |        | WORD   | T\$HILIM                               |
| 5826 |        |        |        |        |        |        |  |
| 5827 | 026250 |        |        |        |        | ENDHRD |  |
| (2)  |        |        |        |        |        | EVEN   |  |
| (3)  | 026250 |        |        |        | L10024 |        |  |
| 5828 |        |        |        |        |        |        |  |
| 5832 |        |        |        |        |        |        |  |
| 5833 | 026250 | 046122 | 030461 | 000    | CNTYPE | ASCIZ  | /RL11/                                 |
| 5834 | 026255 | 102    | 051525 | 040440 | CSRMSG | ASCIZ  | /BUS ADDRESS/                          |
| 5835 | 026271 | 102    | 020122 | 042514 | BRMSG  | ASCIZ  | /BR LEVEL/                             |
| 5836 | 026302 | 042526 | 052103 | 051117 | VECMSG | ASCIZ  | /VECTOR/                               |
| 5837 | 026311 | 104    | 044522 | 042526 | DRMSG  | ASCIZ  | /DRIVE/                                |
| 5838 |        |        |        |        |        |        |  |
| 5842 |        |        |        |        |        |        |  |
| 5843 |        | 026320 |        |        |        | EVEN   |  |
| 5844 |        |        |        |        |        |        |  |
| 5845 | 026320 |        |        |        |        | ENDMOD |  |
| 5846 |        |        |        |        |        |        |  |
| 5847 | 026320 |        |        |        | BGNMOD | SFTPRM |  |
| 5848 |        |        |        |        |        |        |  |
| 5849 | 026320 |        |        |        |        | BGNSFT |  |
| (3)  | 026320 | 000217 |        |        |        | WORD   | L10025-L\$SOFT/2                       |
| 5850 |        |        |        |        |        |        |  |
| 5851 | 026322 |        |        |        |        | GPRMD  | RTMSG, RL, D, 177777, 0, 177777, YES   |
| (4)  | 026322 | 000052 |        |        |        | WORD   | T\$CODE                                |
| (4)  | 026324 | 027165 |        |        |        | WORD   | RTMSG                                  |
| (4)  | 026326 | 177777 |        |        |        | WORD   | 177777                                 |
| (4)  | 026330 | 000000 |        |        |        | WORD   | T\$LOLIM                               |
| (4)  | 026332 | 177777 |        |        |        | WORD   | T\$HILIM                               |
| 5852 | 026334 |        |        |        |        | GPRMD  | SRTMSG, SRL, D, 177777, 0, 177777, YES |
| (4)  | 026334 | 031052 |        |        |        | WORD   | T\$CODE                                |
| (4)  | 026336 | 027010 |        |        |        | WORD   | SRTMSG                                 |
| (4)  | 026340 | 177777 |        |        |        | WORD   | 177777                                 |
| (4)  | 026342 | 000000 |        |        |        | WORD   | T\$LOLIM                               |
| (4)  | 026344 | 177777 |        |        |        | WORD   | T\$HILIM                               |
| 5853 | 026346 |        |        |        |        | GPRML  | FDCHK, DCKFG, 1, YES                   |
| (4)  | 026346 | 020130 |        |        |        | WORD   | T\$CODE                                |
| (4)  | 026350 | 027472 |        |        |        | WORD   | FDCHK                                  |
| (4)  | 026352 | 000001 |        |        |        | WORD   | 1                                      |
| 5854 | 026354 |        |        |        |        | XFERF  | \$                                     |
| (5)  | 026354 | 006044 |        |        |        | WORD   | T\$CODE                                |
| 5855 | 026356 |        |        |        |        | GPRMD  | CHKLMT, CLMT, D, 177777, 0, 128, YES   |
| (4)  | 026356 | 032052 |        |        |        | WORD   | T\$CODE                                |
| (4)  | 026360 | 027027 |        |        |        | WORD   | CHKLMT                                 |
| (4)  | 026362 | 177777 |        |        |        | WORD   | 177777                                 |
| (4)  | 026364 | 000000 |        |        |        | WORD   | T\$LOLIM                               |
| (4)  | 026366 | 000200 |        |        |        | WORD   | T\$HILIM                               |
| 5856 | 026370 |        |        |        | \$     | GPRMD  | INMSG, TYT, D, 177777, 1, 177777, YES  |

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|------|--------|--------|-------|--|
| (4)  | 026370 | 005052 | WORD  | TSCODE                                 |
| (4)  | 026372 | 027275 | WORD  | INMSG                                  |
| (4)  | 026374 | 177777 | WORD  | 177777                                 |
| (4)  | 026376 | 000001 | WORD  | T\$LOLIM                               |
| (4)  | 026400 | 177777 | WORD  | T\$HILIM                               |
| 5857 | 026402 |        | GPRML | DRPMS, DRFLG, 1, YES                   |
| (4)  | 026402 | 021130 | WORD  | TSCODE                                 |
| (4)  | 026404 | 027553 | WORD  | DRPMS                                  |
| (4)  | 026406 | 000001 | WORD  | 1                                      |
| 5858 | 026410 |        | XFERF | 3\$                                    |
| (5)  | 026410 | 032044 | WORD  | TSCODE                                 |
| 5859 | 026412 |        | GPRMD | ERMSG, ELT, D, 177777, 0, 177777, YES  |
| (4)  | 026412 | 001052 | WORD  | TSCODE                                 |
| (4)  | 026414 | 027101 | WORD  | ERMSG                                  |
| (4)  | 026416 | 177777 | WORD  | 177777                                 |
| (4)  | 026420 | 000000 | WORD  | T\$LOLIM                               |
| (4)  | 026422 | 177777 | WORD  | T\$HILIM                               |
| 5860 | 026424 |        | GPRMD | SFTMSG, SEL, D, 177777, 0, 177777, YES |
| (4)  | 026424 | 023052 | WORD  | TSCODE                                 |
| (4)  | 026426 | 027115 | WORD  | SFTMSG                                 |
| (4)  | 026430 | 177777 | WORD  | 177777                                 |
| (4)  | 026432 | 000000 | WORD  | T\$LOLIM                               |
| (4)  | 026434 | 177777 | WORD  | T\$HILIM                               |
| 5861 | 026436 |        | GPRMD | DERPMS, DCD, D, 177777, 0, 177777, YES |
| (4)  | 026436 | 036052 | WORD  | TSCODE                                 |
| (4)  | 026440 | 027616 | WORD  | DERPMS                                 |
| (4)  | 026442 | 177777 | WORD  | 177777                                 |
| (4)  | 026444 | 000000 | WORD  | T\$LOLIM                               |
| (4)  | 026446 | 177777 | WORD  | T\$HILIM                               |
| 5862 | 026450 |        | GPRMD | SEMSG, SET, D, 177777, 0, 177777, YES  |
| (4)  | 026450 | 002052 | WORD  | TSCODE                                 |
| (4)  | 026452 | 027177 | WORD  | SEMSG                                  |
| (4)  | 026454 | 177777 | WORD  | 177777                                 |
| (4)  | 026456 | 000000 | WORD  | T\$LOLIM                               |
| (4)  | 026460 | 177777 | WORD  | T\$HILIM                               |
| 5863 | 026462 |        | GPRMD | DREMSG, DET, D, 177777, 0, 177777, YES |
| (4)  | 026462 | 025052 | WORD  | TSCODE                                 |
| (4)  | 026464 | 027212 | WORD  | DREMSG                                 |
| (4)  | 026466 | 177777 | WORD  | 177777                                 |
| (4)  | 026470 | 000000 | WORD  | T\$LOLIM                               |
| (4)  | 026472 | 177777 | WORD  | T\$HILIM                               |
| 5864 | 026474 |        | GPRML | STLMT, OPFLG, 1, YES                   |
| (4)  | 026474 | 024130 | WORD  | TSCODE                                 |
| (4)  | 026476 | 027516 | WORD  | STLMT                                  |
| (4)  | 026500 | 000001 | WORD  | 1                                      |
| 5865 | 026502 |        | XFERF | 2\$                                    |
| (5)  | 026502 | 013044 | WORD  | TSCODE                                 |
| 5866 | 026504 |        | GPRMD | DAMSG, DAT, D, 177777, 1, 177776, YES  |
| (4)  | 026504 | 003052 | WORD  | TSCODE                                 |
| (4)  | 026506 | 027225 | WORD  | DAMSG                                  |
| (4)  | 026510 | 177777 | WORD  | 177777                                 |
| (4)  | 026512 | 000001 | WORD  | T\$LOLIM                               |
| (4)  | 026514 | 177776 | WORD  | T\$HILIM                               |
| 5867 | 026516 |        | GPRMD | SKMSG, SKT, D, 177777, 1, 177776, YES  |
| (4)  | 026516 | 004052 | WORD  | TSCODE                                 |
| (4)  | 026520 | 027255 | WORD  | SKMSG                                  |

3\$

|      |        |        |       |                                      |
|------|--------|--------|-------|--------------------------------------|
| (4)  | 026522 | 177777 | WORD  | 177777                               |
| (4)  | 026524 | 000001 | WORD  | T\$LOLIM                             |
| (4)  | 026526 | 177776 | WORD  | T\$HILIM                             |
| 5868 | 026530 |        | GPRML | CHANGE, CHFLG. 1, YES                |
| (4)  | 026530 | 010130 | WORD  | T\$CODE                              |
| (4)  | 026532 | 027325 | WORD  | CHANGE                               |
| (4)  | 026534 | 000001 | WORD  | 1                                    |
| 5869 | 026536 |        | XFERF | 1\$                                  |
| (5)  | 026536 | 106044 | WORD  | T\$CODE                              |
| 5870 | 026540 |        | GPRML | STIPMS, STIP, 1, YES                 |
| (4)  | 026540 | 034130 | WORD  | T\$CODE                              |
| (4)  | 026542 | 026760 | WORD  | STIPMS                               |
| (4)  | 026544 | 000001 | WORD  | 1                                    |
| 5871 | 026546 |        | XFERF | 6\$                                  |
| (5)  | 026546 | 013044 | WORD  | T\$CODE                              |
| 5872 | 026550 |        | GPRMD | MXBUF, MXB, D, 177777, 3, 5120, YES  |
| (4)  | 026550 | 011052 | WORD  | T\$CODE                              |
| (4)  | 026552 | 027361 | WORD  | MXBUF                                |
| (4)  | 026554 | 177777 | WORD  | 177777                               |
| (4)  | 026556 | 000003 | WORD  | T\$LOLIM                             |
| (4)  | 026560 | 012000 | WORD  | T\$HILIM                             |
| 5873 | 026562 |        | GPRMD | MINBUF, MNB, D, 177777, 3, 5120, YES |
| (4)  | 026562 | 022052 | WORD  | T\$CODE                              |
| (4)  | 026564 | 027372 | WORD  | MINBUF                               |
| (4)  | 026566 | 177777 | WORD  | 177777                               |
| (4)  | 026570 | 000003 | WORD  | T\$LOLIM                             |
| (4)  | 026572 | 012000 | WORD  | T\$HILIM                             |
| 5874 | 026574 |        | GPRML | R\$ONLY, R\$F, 1, YES                |
| (4)  | 026574 | 026130 | WORD  | T\$CODE                              |
| (4)  | 026576 | 027047 | WORD  | R\$ONLY                              |
| (4)  | 026600 | 000001 | WORD  | 1                                    |
| 5875 | 026602 |        | GPRML | RANPAT, RAN, 1, YES                  |
| (4)  | 026602 | 027130 | WORD  | T\$CODE                              |
| (4)  | 026604 | 027057 | WORD  | RANPAT                               |
| (4)  | 026606 | 000001 | WORD  | 1                                    |
| 5876 | 026610 |        | XFERT | 4\$                                  |
| (5)  | 026610 | 006024 | WORD  | T\$CODE                              |
| 5877 | 026612 |        | GPRMD | ONLONE, PAT, 0, 17, 3, 7, YES        |
| (4)  | 026612 | 030032 | WORD  | T\$CODE                              |
| (4)  | 026614 | 027067 | WORD  | ONLONE                               |
| (4)  | 026616 | 000017 | WORD  | 17                                   |
| (4)  | 026620 | 000000 | WORD  | T\$LOLIM                             |
| (4)  | 026622 | 000007 | WORD  | T\$HILIM                             |
| 5878 | 026624 |        | GPRML | WCKMSG, WCK, 1, YES                  |
| (4)  | 026624 | 035130 | WORD  | T\$CODE                              |
| (4)  | 026626 | 027607 | WORD  | WCKMSG                               |
| (4)  | 026630 | 000001 | WORD  | 1                                    |
| 5879 | 026632 |        | GPRMD | CMMSG, RDT, D, 177777, 0, 128, YES   |
| (4)  | 026632 | 006052 | WORD  | T\$CODE                              |
| (4)  | 026634 | 027644 | WORD  | CMMSG                                |
| (4)  | 026636 | 177777 | WORD  | 177777                               |
| (4)  | 026640 | 000000 | WORD  | T\$LOLIM                             |
| (4)  | 026642 | 000200 | WORD  | T\$HILIM                             |
| 5880 | 026644 |        | GPRMD | DEMSG, DDT, D, 177777, 0, 175, YES   |
| (4)  | 026644 | 007052 | WORD  | T\$CODE                              |
| (4)  | 026646 | 027131 | WORD  | DEMSG                                |