RL01

RL01 PERFORMANCE EXERCISER

MD-11-DZRLE-A

EP-DZRLE-A

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MADE IN USA

IDENTIFICATION

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AUTHOR	D. DENNIS

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1 0 GENERAL INFORMATION

1 1 PROGRAM ABSTRACT

1 1 1 STRUCTURE OF PROGRAM

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 RL01/RLV11 RL01 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 RL01, 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

PDP-11/LSI-11 PROCESSOR WITH 16K OR MORE OF CORE
CONSOLE DEVICE (LA30,LA36,VT50,ETC)
RL11/RLV11 CONTROLLER(S)
1 - 8 RL01 DRIVES
1 - 8 RL01K 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

RL01 USERS MANUAL (EK-RL01-UG-PRE)
YYDP USERS MANUAL
DIAGNOSTIC SUPERVISOR PROGRAM LISTING

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

THE RL01 SUBSYSTEM SHOULD HAVE SUCCESSFULLY RUN THE FOLLOWING PROGRAMS:

MD-11-DZRLA	RL11/RLV11 RL01 CONTROLLER TEST (PART 1)
MD-11-DZRLB	RL11/RLV11 RL01 CONTROLLER TEST (PART 2)
MD-11-DVRLA	RLV11 RL01 DISKLESS TEST (RLV11 ONLY)
MD-11-DZRLC	RL01 DRIVE TEST (PART 1)
MD-11-DZRLD	RL01 DRIVE TEST (PART 2)

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE RL01 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, UFD1, UFD2)

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 HARDCORE QUESTIONS
D) RECEIVE PROMPT (DS A>)
E) ENTER STA<CR>
F) ANSWER HARDWARE AND SOFTWARE QUESTIONS
G) GET END OF PASS MESSAGES OR ERROR 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 <TEST-LIST>)

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 OPERATOR SEE EXAMPLE AT END OF 2 3 1

2 3 1 2 PASS SWITCH (/PASS <PASS-CNT>)

<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 <FLAG-LIST>)

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:

HOE	HALT ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN ERROR IS ENCOUNTERED
LOE	LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT, 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 RESTART COMMAND

****
RES(TART)/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 <UNIT-LIST>)

'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 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 <PASS-CNT>)

<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 <FLAG-LIST>)

FLAG-LIST> IS SAME AS IN START COMMAND BUT UNSPECIFIED FLAGS PERTAIN 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

****

PPO(CEED)/FLAGS (FLAG-LIST)
****

SEQ 0007

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 EPROR CALL NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED

2 3 5 CREATE CORE IMAGE COMMAND

****
CC 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

****
DRO(P)/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

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 RESPONCE

RL11 (L) Y?

ANSWER YES(Y) IF YOU HAVE AN RL11 CONTROLLER, NO(N) IF YOU HAVE AN RL/11 CONTROLLER

BUS ADDRESS (O) 174400?

ANSWER WITH THE BUS ADDRESS OF THE CONTROLLER

VECTOR (O) 330?

ANSWER WITH THE INTERRUPT VECTOR OF THE CONTROLLER

BR LEVEL (O) 5?

ANSWER WITH THE INTERRUPT PRIORITY OF THE CONTROLLER

DRIVE (O) 0?

ANSWER WITH THE DRIVE(S) CONNECTED TO THE CONTROLLER

2 3 13 SOFTWARE PARAMETERS

THE FOLLOWING QUESTIONS ARE ASKED IF REQUESTED ON A START, RESTART,
OR CONTINUE THEY ALLOW FLEXABILITY 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 13 1 RETRY LMT X?

THIS IS THE NUMBER OF TIMES THE PROGRAM
WILL ATTEMPT A COMMAND BEFORE IT QUITS 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 POSSIBILTIES
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?

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

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 HRD 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 SK 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/WRITTEN
(*10(10)) ON WHICH THE DRIVE WILL BE DROPPED

LIMITS 1 - 65,535

2 3 13 14 SK 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 OPERTATION 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

NORMAL TRANSFERS ARE RANDOM BETWEEN 3 AND 1280 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 26 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 12 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

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
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 EXLICIT 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)

3 0 EXECUTION TIMES

EXECUTION 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 RELEVENT DATA

3 1 ERROR REPORTING

THE FOLLOWING ARE ERROR HEADINGS THAT MAY BE ENCOUNTERED
WHILE RUNNING A BREIF 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 CMP - 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

IL 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

RL01K 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

ER' 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
MPLIES THERE WERE NO DRIVE ERRORS WHICH MAY HAVE
ALSED DRIVE READY TO GO AWAY

TR.' ERR

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 ERROR IF THE
TRACK IS NOT CORRECT THIS ERROR WILL PRINT THE
POSTION BEFORE THE LAST SEEK THE PRESENT POSITION
AND THE EXPECTED POSITION

MIS-SK ERR

AFTER A SEEK WAS DONE, READ HEADER IS DONE TO VER F
THE SEEK THE ERROR PRINTOUT WILL INCLUDE
THE LAST POSTION BEFORE THE SEEK THE PRESENT POS-
ITION AND THE EXPECTED POSTION

DRV STAT ERR

THE RESULT OF A GET STATUS OPERATION IS INCORRECT
EITHER A ERROR BIT IS SET OR THE STATE IS WRONG

FE ERR ENC'D

IN ATTEMPTING A RETRY OF A FUNCTION THAT WAS IN ERROR
THE RETRY WAS SUCCESSFUL ERROR INFORMATION CONSISTS
OF BUS ADDRESS, DISK ADDRESS, NUMBER OF RETRIES BEFORE
SUCCESS AND ERROR TYPE

HRD ERR

THE NUMBER OF RETRIES WERE EXHAUSTED WITH OUT SUCCESS
THE ERROR PRINTOUT CONSISTS OF ALL REGISTERS BEFORE COMMAND
AND AT TIME OF ERROR

INIT WR OF SEC BAD

WHILE WRITING THE PACK INITIALLY THE SECTOR INDICATED
COULD NOT BE WRITTEN AND VERIFIED THIS SECTOR
WAS NOT IN THE BAD SECTOR FILE EITHER STOP THE EXERCISER
AND CHANGE CARTRIDGE. STOP THE EXERCISER AND VERIFY THE
CARTRIDGE OR IGNORE ALL ERRORS FORM THAT SECTOR

3.2 ERROR HALTS

ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION
WITH 'FLAG HOE THERE ARE NO OTHER HALTS

4.0 PERFORMANCE AND PROGRESS REPORTS

4.1 PERFORMANCE REPORTS

PERFORMANCE REPORTS ARE GIVEN AUTOMATICALLY (PER SOFTWARE PARA-
METERS), WHEN A DRIVE IS DROPPED, OR AT OPERATOR REQUEST (PRINT)
THE FORMAT IS

*** RL01 PERFORMANCE REPORT ***

TIME HH MM SS RLCS XXXXXX DRIVE Y RUNNING OR DROPPED DH DM
PACK SERIAL # NNNNNNNNNN
SEEKS IIIII
BITS READ JJJJJJJJ (#16)
BITS WRITTEN KKKKKKKK (#16)

ERRORS
DRIVE N SEEK N TRACK N DATA N
HARD N SOFT N

DCF N HCRC N NXM N HNF N
DLT N OPI N

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 B TS READ (*16) SINCE 0 00 00
KKKK IS TOTAL NUMBER OF BITS WRITTEN (*16 SINCE 0 00 00
NN IS NUMBER OF THAT TYPE ERROR SINCE 0 00 00

PROGRESS REPORTS

THE ONLY PROGRESS REPORT IS THE AUTOMATIC PERFORMANCE REPORT

5.0 DEVICE INFORMATION TABLES

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

RLCS - 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

RLBA - BUS ADDRESS REGISTER (XXXXX2)

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

RLDA - 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

6 0 TEST SUMMARIES

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 HCRC, THEN STEP 24, ELSE STEP 21

        IF DCRC, THEN STEP 29, ELSE STEP 22

        IF HNF, THEN STEP 30, ELSE STEP 23

        ICU 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        WC
                        SKTO
                        SPE
                        WGE
                        WDE
                        CHE

34      GO TO STEP 4
? 0 PROGRAM LISTING
    ---------------
```

```
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  MDHEDR
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$CLEAN
 (4)    002046    026176                          WORD    L$HARD
 (4)    002050    026322                          WORD    L$SOFT
 (4)    002052    002104                          WORD    L$DVTYP
 (4)    002054    007572                          WORD    L$RPT
 (4)    002056    007454                          WORD    L$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  <RL01>
   (3)  002104  046122  030460     000           ASCIZ  @RL01@
   (2)          002112                          EVEN
 2834
 2835
 2836                                 .SBTTL  BIT AND OFFSET DEFINITIONS
 2837
 2838                                 .DEFINITIONS
 2839
 2840
 2841   002112                        BGNMOD  GLBEQAT
 2842
 2843   002112                        EQUALS
   (1)
   (1)                                 ; BIT DIFINITIONS
   (1)
   (1)          100000                BIT15== 100000
   (1)          040000                BIT14== 40000
   (1)          020000                BIT13== 20000
   (1)          010000                BIT12== 10000
   (1)          004000                BIT11== 4000
   (1)          002000                BIT10== 2000
   (1)          001000                BIT09== 1000
   (1)          000400                BIT08== 400
   (1)          000200                BIT07== 200
   (1)          000100                BIT06== 100
   (1)          000040                BIT05== 40
    1           000020                BIT04== 20
    1           000010                BIT03== 10
    1           000004                BIT02== 4
    1           000002                BIT01== 2
   (1)          000001                BIT00== 1
   (1)
   (1)          001000                BIT9==  BIT09
   (1)          000400                BIT8==  BIT08
   (1)          000200                BIT7==  BIT07
   (1)          000100                BIT6==  BIT06
   (1)          000040                BIT5==  BIT05
   (1)          000020                BIT4==  BIT04
   (1)          000010                BIT3==  BIT03
   (1)          000004                BIT2==  BIT02
   (1)          000002                BIT1==  BIT01
   (1)          000001                BIT0==  BIT00
   (1)
   (1)                                   EVENT FLAG DEFINITIONS
   (1)                                     EF32 EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
```

```
(1)                                     ;   EF16 EF01 AVAILABLE FOR PROGRAM USE
(1)                                     ;
(1)         000040                      EF START==      32          ; START COMMAND WAS ISSUED
(1)         000037                      EF RESTART==    31          ; RESTART COMMAND WAS ISSUED
(1)         000036                      EF CONTINUE==   30          ; CONTINUE COMMAND WAS ISSUED
(1)         000035                      EF NEW==        29          ; A NEW PASS HAS BEEN STARTED
(1)         000034                      EF PWR==        28          ; A POWER-FAIL/POWER-UP OCCURRED
(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                      EF09==  9
(1)         000010                      EF08==  8
(1)         000007                      EF07==  7
(1)         000006                      EF06==  6
(1)         000005                      EF05==  5
(1)         000004                      EF04==  4
(1)         000003                      EF03==  3
(1)         000002                      EF02==  2
(1)         000001                      EF01==  1
(1)
(1)
(1)                                       PRIORITY LEVEL DEFINITIONS
(1)
(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
2845        000000                      CS=0                        ;CONTROL AND STATUS OFFSET
2846        000002                      BA=2                        ;BUSADDRESS OFFSET
2847        000004                      DA=4                        ;DISK ADDRESS OFFSET
2848        000006                      MP=6                        ;MULTI PURPOSE OFFSET
2849                                     CONSTANT OFFSETS FOR INDIVIDUAL DRIVE BUFFERS
2850                                     THE ONLY POSITION THAT IS CRITICAL IS THAT OF
2851                                     ""PRPOS""  IT M U S T (MUST) BE THE LAST ENTRY OF THE BUFFER
2852
2853        000000                      SKCNT=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                      DERCNT=20                   ;DRIVE ERROR COUNT
2862        000022                      DCRCER=22                   ;DATA CRC ERROR COUNT
2863        000024                      HCRCER=24                   ;HEADER CRC ERROR COUNT
```

```
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                  NXMCNT=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                  BSECPT=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
2897            000001                  DRDY=BIT0                DRIVE READY
2898            000100                  INTEN=BIT6               INTERRUPT ENABLE
2899            100000                  ERR=BIT15                COMPOSITE ERROR
2900            040000                  DERR=BIT14               DRIVE ERROR
2901            100000                  WDE=BIT15                WRITE DATA ERROR
2902            040000                  HCE=BIT14                HEAD CURRENT ERROR
2903            020000                  WL=BIT13                 WRITE LOCK
2904            010000                  SKTO=BIT12               SEEK TIMEOUT ERROR
2905            004000                  SPE=BIT11               ;SPINDLE TIMEOUT/UNDER OVER SPEED
2906            002000                  WGE=BIT10                WRITE GATE ERROR
2907            001000                  VC=BIT9                 ;VOLUME CHECK
2908            000400                  DSE=BIT8                 DRIVE SELECT ERROR
2909            020000                  NXM=BIT13               ;NON-EXISTANT MEMORY ERROR
2910            010000                  DLT=BIT12                DATA LATE
2911            004000                  DCRC=BIT11              ;DATA CRC ERROR
2912            004000                  HCRC=BIT11              ;HEADER CRC ERROR
2913            010000                  HNF=BIT12               ;HEADER NOT FOUND ERROR
2914            002000                  OPI=BIT10               ;OPERATION INCOMPLETE ERROR
2915            000200                  CRDY=BIT7               ;CONTROLLER READY
2916            000040                  BA17=BIT5                EXTENDED BUS ADDRESS BIT 17
2917            000020                  BA16=BIT4                EXTENDED BUS ADDRESS BIT 16
2918            000002                  WPCHK=BIT1               WITE CHECK FUNCTION CODE
2919            000004                  GSTAT=BIT2               GET DRIVE STATUS FUNCTION CODE
```

```
                000006          SEEK=BIT1!BIT2          ;SEEK FUNCTION CODE
                000010          RDHDR=BIT3              ;READ HEADER FUNCTION CODE
                000012          WRITE=BIT3!BIT1         ;WRITE FUNCTION CODE
                000014          READ=BIT3!BIT2          ;READ FUNCTION CODE
                000013          DRST=BIT3!BIT1!BIT0     ;DRIVE RESET COMMAD CODE FOR DRIVE COMMAD WORD
                000003          GSBIT=BIT1!BIT0         ;GET STATUS COMMAND CODE FOR DRIVE COMMAND WORD
                000001          MK=BIT0                 ;MARKER BIT FOR DRIVE COMMAND WORD(SEEK,GET STATUS)
                000004          SIGN=BIT2               ;DIRECTION FOR SEEK(0=AWAY FROM SPINDLE)
                000020          SKHS=BIT4               ;HEAD SELECT FOR SEEK
                000100          HEAD=BIT6               ;HEAD SELECT FOR READ,WRITE,GET STATUS

                                ;OFFSET FOR HARDWARE P-TABLE

                000000          CSR=0
                000002          VECT=2
                000004          PRIOR=4
                000006          DRBT=6
                000010          CNT=10

                                ;OFFSET FOR SOFTWARE P-TABLE

                000000          RLT=0
                000002          ELT=2
                000004          SET=4
                000006          DAT=6
                000010          SKT=10
                000012          TYT=12
                000014          RDT=14
                000016          DDT=16
                000020          CHFLG=20
                000022          MXB=22
                000024          MXH=24
                000026          MNH=26
                000030          MXC=30
                000032          MNC=32
                000034          MXS=34
                000036          MNS=36
                000040          DCHFG=40
                000042          DPFLG=42
                000044          MNB=44
                000046          SEL=46
                000050          OPFLG=50
                000052          DET=52
                000054          ROF=54
                000056          RAN=56
                000060          PAT=60
                000062          SRLT=62
                000064          CLMT=64
                000066          AUTO=66
                000070          STIP=70
                000072          WCH=72
                000074          DCD=74

002112                          ENDMOD
```

```
2976
2977
2978                            SBTTL  GLOBAL DATA AND CONSTANTS
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            SYSMSK  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            CYLMSK  WORD   100177          ;MASK FOR CYLINDER ONLY
2991  002132  100077            SECMSK  WORD   100077          ;MASK OUT SECTOR BITS
2992
2993                            ;THE FOLLOWING LOCATIONS ARE CLEARED AS A GROUP (DOWN TO 'STFLG')
2994                            ;THEREFORE DON'T INSERT ANY CONSTANTS
2995
2996  002134  174400            CNTLR1  WORD   174400          ;CSR OF CONTROLLER 1 (LUN 0-3)
2997  002136  000000            CNTLR2  WORD   0               ;CSR OF CONTROLLER 2 (LUN 4-7)
2998  002140  000000            LSTDR1  WORD   0               ;BUFFER POINTER OF DRIVE
2999  002142  000000            LSTDR2  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            BPRIOP  WORD   0
3003  002152  000000            BDRSEL  WORD   0               ;DRIVE  "    "
3004  002154  000000            HDRFND  WORD   0               ;FLAG TO INDICATE HDR 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 CONTROLLER
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            E.CS    WORD   0               ;IMAGES OF REGISTERS
3029  002236  000000            E.BA    WORD   0               ;ON INTERRUPT
3030  002240  000000            E.DA    WORD   0
3031  002242  000000            E.MR    WORD   0
```

```
3022  002244  000000                  EMP1    WORD   0               ,
3033  002246  000000                  EMP2    WORD   0               ,
3034  002250  000000                  SYSCLK  WORD   0               ,FLAG INDICATING PRESENSE 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 FUNCTION
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                  OPCALL  WORD   0
3054  002312  000000                  NCALL   WORD   0
3055
3056  002314                          ENDMOD
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  CRLBA   ASCIZ  " (RLBA)  "
3075  002373     040  051050  042114  CRLDA   ASCIZ  " (RLDA)  "
3076  002405     040  051050  046514  CRLMP   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 DR ERR
3083  002521     102  043525     000  PRGER   ASCIZ  /BUG/
3084  002525     111  044516  020124  NWRTS   ASCIZ  /INIT WR OF SEC BAD
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 ENC'D
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  MHDER    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  SFEMSG   ASCIZ  /SFT ERR LMT EXC'D/
3103  003176  040504  040524  042440  DCDMSG   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  SEXHAU   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  /GARBBLED 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 FACTORY 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  / REC POS  /
3123  003672  051104  042040  042111  NOPWR    ASCIZ  /DR DID RECOVR FROM PWR UP
3124  003723     101  020124  052502  BUSAD    ASCIZ  /AT BUS ADDR
3125  003741     122  052105  054522  MRT      ASCIZ  /RETRYS  /
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  / DCK
3136  004125     040  046104  000124  MTDLT    ASCIZ  / DLT/
3137  004132  047440  044520     000  MTOPI    ASCIZ  / OPI
3138  004137     040  054116  000115  MTNXM    ASCIZ  / NXM/
3139  004144  042040  053122     000  MTDRV    ASCIZ  / DRV/
3140  004151     124  051505  044524  MSTART   ASCIZ  /TESTING STARTED/
3141  004171     127  044522  044524  MSWRPK   ASCIZ  /WRITING PACK  /
3142
3143                    THIS LIST OF ASCII TEXT IS USED AS A TABLE FOR PRINTING
3144                    FUNCTIONS IN ERROR MESSAGES   TABLE IS "MTCR - MTPC"
3145                    THE ORDER IS IMPORTANT AS WELL AS THE LENGTH OF EACH
3146                    ASCIZ STRING  EACH STRING IS SEVEN(10) BYTES PLUS ZERO
```

```
                                        ;FILL BYTE (TOTAL 8(EIGHT) BYTES) LONG   USED IN LINE1
                                        ;SUBROUTINE
                                        ;  .                  .....

004210  053440  041522  045510  MTCR    .ASCIZ  / WRCHK /
004220  043440  051524  040524  MTGS     ASCIZ  / GTSTAT/
004230  051440  042505  020113  MTSK     ASCIZ  / SEEK  /
004240  051040  044104  051104  MTRH     ASCIZ  / RDHDR /
004250  053440  044522  042524  MTWR    .ASCIZ  / WRITE /
004260  051040  040505  020104  MTRD     ASCIZ  / READ  /

                                        ;
                                        ;END OF LIST NOW YOU CAN PUT ANY THING YOU WANT HERE
                                        ;.

                                         EVEN

004270                                          ENDMOD

                                         SBTTL  ERROR MESSAGES

004270                                  BGNMOD  GLBERR

                                                                ;GENERAL ERROR REPORT

004270                                  BGNMSG  ERR1
004270  004737  005460                          JSR     PC,LINE3
004274                                          ENDMSG
004274                                  L10000
004274  104023                                  EMT     C$MSG

                                                                ;MIS-SEEK ERROR REPORT

004276                                  BGNMSG  ERR2
004276  004737  005460                          JSR     PC,LINE3
004302                                          PRINTB  #FMT4,#DIFMSG,DIFWD(R4),#LPS,LSTHDR(R4),#EPS,PRPOS(R4),#PPS,R1
004302  010146                                  MOV     R1,-(SP)
004304  012746  003657                          MOV     #RPS,-(SP)
004310  016446  000120                          MOV     PRPOS(R4),-(SP)
004314  012746  003644                          MOV     #EPS,-(SP)
004320  016446  000050                          MOV     LSTHDR(R4),-(SP)
004324  012746  003631                          MOV     #LPS,-(SP)
004330  016446  000066                          MOV     DIFWD(R4),-(SP)
004334  012746  002417                          MOV     #DIFMSG,-(SP)
004340  012746  005777                          MOV     #FMT4,-(SP)
004344  012746  000011                          MOV     #11,-(SP)
004350  010600                                  MOV     SP,R0
004352  104014                                  EMT     C$PNTB
004354  062706  000024                          ADD     #24,SP
004360                                          ENDMSG
004360                                  L10001
004360  104023                                  EMT     C$MSG
```

```
3189                                                                    ;SOFT ERROR RECOVERABLE ERROR REPORT
3190  004362                                BGNMSG  ERR3
3191  004362  004737  005214                        JSR     PC,LINE1
3192  004366                                        PRINTB  #FMT2A,#CRLCS,SOFTCS(R4),#CRLBA,@BBA(R4),#CRLDA,LSTDA(R4)
 (13) 004366  016446  000064                        MOV     LSTDA(R4),-(SP)
 (12) 004372  012746  002373                        MOV     #CRLDA,-(SP)
 (11) 004376  017446  000110                        MOV     @BBA(R4),-(SP)
 (10) 004402  012746  002361                        MOV     #CRLBA,-(SP)
  (9) 004406  016446  000116                        MOV     SOFTCS(R4),-(SP)
  (8) 004412  012746  002333                        MOV     #CRLCS,-(SP)
  (7) 004416  012746  005712                        MOV     #FMT2A,-(SP)
  (6) 004422  012746  000007                        MOV     #7,-(SP)
  (5) 004426  010600                                MOV     SP,R0
  (4) 004430  104014                                EMT     C$PNTB
  (4) 004432  062706  000020                        ADD     #20,SP
3193  004436                                        PRINTB  #FMT5,#MRT,RETRY(R4),#ERT,RTYPE(R4)
 (11) 004436  016446  000052                        MOV     RTYPE(R4),-(SP)
 (10) 004442  012746  003752                        MOV     #ERT,-(SP)
  (9) 004446  016446  000036                        MOV     RETRY(R4),-(SP)
  (8) 004452  012746  003741                        MOV     #MRT,-(SP)
  (7) 004456  012746  006030                        MOV     #FMT5,-(SP)
  (6) 004462  012746  000005                        MOV     #5,-(SP)
  (3) 004466  010600                                MOV     SP,R0
  (4) 004470  104014                                EMT     C$PNTB
  (4) 004472  062706  000014                        ADD     #14,SP
3194  004476                                        ENDMSG
  (3) 004476                                L10002
  (3) 004476  104023                                EMT     C$MSG
3195
3196                                                                    ;GET STATUS ERROR REPORT
3197
3198  004500                                BGNMSG  ERR4
3199  004500  004737  005460                        JSR     PC,LINE3
3200  004504                                        PRINTB  #FMT6,#MST,E_MP,#MST1,ST1,ST2
 (12) 004504  013746  002306                        MOV     ST2,-(SP)
 (11) 004510  013746  002304                        MOV     ST1,-(SP)
 (10) 004514  012746  004005                        MOV     #MST1,-(SP)
  (9) 004520  013746  002242                        MOV     E_MP,-(SP)
  (8) 004524  012746  003770                        MOV     #MST,-(SP)
  (7) 004530  012746  006044                        MOV     #FMT6,-(SP)
  (6) 004534  012746  000006                        MOV     #6,-(SP)
  (3) 004540  010600                                MOV     SP,R0
  (4) 004542  104014                                EMT     C$PNTB
  (4) 004544  062706  000016                        ADD     #16,SP
3201  004550                                        ENDMSG
  (3) 004550                                L10003
  (3) 004550  104023                                EMT     C$MSG
3202
3203
3204                                                                    ;DATA ERROR SUMMARY
3205
3206  004552                                BGNMSG  ERR6
3207  004552  004737  005374                        JSR     PC,LINE2
3208  004556  016400  000042                        MOV     BMP(R4),R0
3209  004562                                        PRINTB  #FMT9A,DECNT,R0
 (9)  004562  010046                                MOV     R0,-(SP)
```

```
   (8)  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$PNTB
   (4)  004604  062706  000010                ADD     #10,SP
 3210   004610                                ENDMSG
   (3)  004610                        L10004
   (3)  004610  104023                        EMT     C$MSG
 3211
 3212                                                       ;NON RECOVERABLE ERROR REPORT
 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$PNTB
   (4)  004636  062706  000010                ADD     #10,SP
 3216   004642  004737  005460                JSR     PC,LINE3
 3217   004646                                ENDMSG
   (3)  004646                        L10005
   (3)  004646  104023                        EMT     C$MSG
 3218
 3219                                                       ;BAD DATA COMPARE ERROR REPORT
 3220
 3221   004650                        BGNMSG  ERR8
 3222   004650                                PRINTB  #FMT10,#TIME HOUR MINUTE,SECOND,#MRLCS,DCS(R4),#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(R4) #CRLDA BDA(R4),#EXP,GDDAT,#RCD,(R2)
  (15)  004732  011246                        MOV     (R2),-(SP)
  (14)  004734  012746  004056                MOV     #RCD,-(SP)
  (13)  004740  013746  002216                MOV     GDDAT,-(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     C$PNTB
   (4)  005004  062706  000024                ADD     #24,SP
 3224   005010                                PRINTB  #FMT10B,R2
   (8)  005010  010246                        MOV     R2,-(SP)
   (7)  005012  012746  006373                MOV     #FMT10B,-(SP)
   (6)  005016  012746  000002                MOV     #2,-(SP)
   (3)  005022  010600                        MOV     SP,R0
   (4)  005024  104014                        EMT     C$PNTB
   (4)  005026  062706  000006                ADD     #6,SP
 3225   005032                                ENDMSG
   (3)  005032                          L10006
   (3)  005032  104023                        EMT     C$MSG
 3226                                                        ,DRIVE ERROR
 3227
 3228   005034                          BGNMSG  ERR9
 3229
 3230   005034  004737  005460                JSR     PC,LINE3
 3231   005040                                PRINTB  #FMT13,#MST,R1,#LPS,LSTHDR(R4)
  (11)  005040  016446  000050                MOV     LSTHDR(R4),-(SP)
  (10)  005044  012746  003631                MOV     #LPS,-(SP)
   (9)  005050  010146                        MOV     R1,-(SP)
   (8)  005052  012746  003770                MOV     #MST,-(SP)
   (7)  005056  012746  006431                MOV     #FMT13,-(SP)
   (6)  005062  012746  000005                MOV     #5 -(SP)
   (3)  005066  010600                        MOV     SP,R0
   (4)  005070  104014                        EMT     C$PNTB
   (4)  005072  062706  000014                ADD     #14,SP
 3232   005076                                ENDMSG
   (3)  005076                          L10007
   (3)  005076  104023                        EMT     C$MSG
 3233
 3234
 3235                                                        ,INVALID ENTRY IN P-TABLE REPORT
 3236
 3237   005100                          BGNMSG  ERR10
 3238   005100                                PRINTB  #FMT11,#MPT R1,#MRLCS,BCSR,#MVEC,BVEC
  (13)  005100  013746  002146                MOV     BVEC,-(SP)
  (12)  005104  012746  003574                MOV     #MVEC,-(SP)
  (11)  005110  013746  002144                MOV     BCSR,-(SP)
  (10)  005114  012746  002323                MOV     #MRLCS,-(SP)
   (9)  005120  010146                        MOV     R1,-(SP)
   (8)  005122  012746  003546                MOV     #MPT,-(SP)
   (7)  005126  012746  006401                MOV     #FMT11,-(SP)
   (6)  005132  012746  000007                MOV     #7,-(SP)
   (3)  005136  010600                        MOV     SP,R0
   (4)  005140  104014                        EMT     C$PNTB
   (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  005460                JSP     PC,LINE3
 3245
```

```
3246  005154                                  ENDMSG
 (3)  005154                          L10011:
 (3)  005154  104023                         EMT     C$MSG
3247
3248  005156                          BGNMSG  ERR13
3249
3250  005156  004737  005460                 JSR     PC,LINE3
3251  005162                                  PRINTB  #FMT12,#SMSG,BDA(R4)
 (9)  005162  016446  000040                 MOV     BDA(R4),-(SP)
 (8)  005166  012746  002550                 MOV     #SMSG,-(SP)
 (7)  005172  012746  006421                 MOV     #FMT12,-(SP)
 (6)  005176  012746  000003                 MOV     #3,-(SP)
 (3)  005202  010600                         MOV     SP,R0
 (4)  005204  104014                         EMT     C$PNTB
 (4)  005206  062706  000010                 ADD     #10,SP
3252
3253  005212                                  ENDMSG
 (3)  005212                          L10012:
 (3)  005212  104023                         EMT     C$MSG
3254
3255  005214  016437  000044  002274  LINE1  MOV     FUNC(R4),FASPNT         ;GET FUNCTION
3256  005222  012737  004210  002272         MOV     #MTCR,FASCII            ;FIRST FUNCTION ASCIZ
3257  005230  042737  000100  002274         BIC     #INTEN,FASPNT           ;CLEAR INTERRUPT ENABLE
3258  005236  006237  002274                 ASR     FASPNT                  ;ALIGN
3259  005242  005337  002274          1$     DEC     FASPNT                  ;DOWN COUNT FUNCTION
3260  005246  001404                         BEQ     2$                      ;FOUND?
3261  005250  062737  000010  002272         ADD     #8.,FASCII              ;NO NEXT ONE
3262  005256  000771                         BR      1$                      ;LOOP
3263
3264  005260                          2$:
3265
3266  005260                                  PRINTB  #FMT1,#TIME,HOUR,MINUTE,SECOND,#MPLCS,DCS(R4),#DRNM,<B,DRSEL+1(R4)>
 (15) 005260  005046                         CLR     -(SP)
 (15) 005262  156416  000107                 BISB    DRSEL+1(R4),(SP)
 (14) 005266  012746  003620                 MOV     #DRNM,-(SP)
 (13) 005272  016446  000104                 MOV     DCS(R4),-(SP)
 (12) 005276  012746  002323                 MOV     #MRLCS,-(SP)
 (11) 005302  013746  002226                 MOV     SECOND,-(SP)
 (10) 005306  013746  002230                 MOV     MINUTE,-(SP)
  (9) 005312  013746  002232                 MOV     HOUR,-(SP)
  (8) 005316  012746  002314                 MOV     #TIME,-(SP)
  (7) 005322  012746  005626                 MOV     #FMT1,-(SP)
  (6) 005326  012746  000011                 MOV     #11,-(SP)
  (3) 005332  010600                         MOV     SP,R0
  (4) 005334  104014                         EMT     C$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,R0
 (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)
  (3) 005446  010600                                MOV     SP,R0
  (4) 005450  104014                                EMT     C$PNTB
  (4) 005452  062706  000024                        ADD     #24,SP
3271  005456  000207                                RTS     PC
3272
3273  005460  004737  005214                LINE3   JSR     PC,LINE1
3274  005464                                        PRINTB  #FMT2,#CRLCS,BCSADR(R4),#CRLBA,@BBA(R4),#CPLDA,BDA(R4),#CRLMP,BMP(R4)
 (15) 005464  016446  000C42                        MOV     BMP(R4),-(SP)
 (14) 005470  012746  002405                        MOV     #CRLMP,-(SP)
 (13) 005474  016446  000040                        MOV     BDA(R4),-(SP)
 (12) 005500  012746  002373                        MOV     #CRLDA,-(SP)
 (11) 005504  017446  000110                        MOV     @BBA(R4),-(SP)
 (10) 005510  012746  002361                        MOV     #CRLBA,-(SP)
  (9) 005514  016446  000046                        MOV     BCSADR(R4),-(SP)
  (8) 005520  012746  002333                        MOV     #CRLCS,-(SP)
  (7) 005524  012746  005671                        MOV     #FMT2,-(SP)
  (6) 005530  012746  000011                        MOV     #11,-(SP)
  (3) 005534  010600                                MOV     SP,R0
  (4) 005536  104014                                EMT     C$PNTB
  (4) 005540  062706  000024                        ADD     #24,SP
3275  005544                                        PRINTB  #FMT3,#CRLCS,E CS #CPLBA E BA #CPLDA E DA,#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,R0
  (4) 005616  104014                                EMT     C$PNTB
  (4) 005620  062706  000024                        ADD     #24,SP
3276  005624  000207                                RTS     PC
3277
3278                                    ;FORMAT STATMENTS
3279
3283
3284  005626  052045  055045  022462  FMT1:    ASCII   /%T%Z2%A:%Z2%A %Z2
3285  005647     045  022524  033117  FMT1?    .ASCIZ  /%T%06%T%01/
3286  005662  052045  052045  047045  FMT1A    ASCIZ   /%T%T%N/
3287  005671     045  041101  043105  FMT2     .ASCII  /%ABEFORE ERR%T%06
3288  005712  052045  047445  022466  FMT2A    ASCIZ   /%T%06%T%06%T%06%N/
```

```
3289  005734  040445  052101  042440  FMT3:    .ASCIZ  /%AAT ERR    %T%06%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%N/
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*** RL01 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%AERRORS%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 NXM     %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-L$HW/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-L$SW/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          DRLMT     WORD   3                    ,DRIVE ERROR L'MIT
 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
```

```
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$PNTS
 (4)  007606  062706  000004                   ADD     #4,SP
3404
3405  007612  010446                           MOV     R4,-(SP)                ,SAVE PRESENT VALUE OF R4
3406
3407  007614  012704  024752                   MOV     #DRBUF,R4               ;START OF DRIVE BUFFER
3408  007620  005764  000104          1$      TST     DCS(R4)                 ,IS THERE A DRIVE?
3409  007624  001402                           BEQ     2$                      ,NO, GET NEXT ONE
3410
3411  007626  004737  011634                   JSR     PC,REPORT               ;TYPE OUT SUMMARY
3412
3413  007632  062704  000122          2$      ADD     #FRPOS+2,R4             ;NEXT DRIVE
3414  007636  020427  026172                   CMP     R4,#ENDBUF              ,AT THE END?
3415  007642  001366                           BNE     1$                      ,NO, TRY NEXT
3416
3417  007644  012604                           MOV     (SP)+,R4                ,RESTORE R4
3418
3419
3420  007646                          ENDRPT
 (3)  007646                          L10015
 (3)  007646  104025                           EMT     C$PPT
3421
3422  007650                                  ENDMOD
3423
3424                                   SBTTL   INITIALIZATION CODE
3425
3426  007650                          BGNMOD  INITCODE                        ,START OF INITIALIZE CODE
3427
3428  007650                                  BGNINIT
3429
3430  007650                                  SETPRI  #340                    ,PRIORITY TO SEVEN
 (3)  007650  012700  000340                   MOV     #340,R0
 (3)  007654  104041                           EMT     C$SPRI
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,R0
 (3)  007702  104050                           EMT     C$REFG
3438  007704                                  BNCOMPLETE      3$
 (2)  007704  103076                           BCC     3$
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          11$     BITB    R2,DRUT
3443  007726  001446                          BEQ     13$
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  12$     BIT     #1,@DCS(R4)
3449  007756  001014                          BNE     15$
3450  007760                                  WAITMS  #10.
 (3)  007760  012700  000012                  MOV     #10.,R0
 (2)  007764  104026                          EMT     C$WTM
3451  007766  005301                          DEC     R1
3452  007770  001367                          BNE     12$
3453
3454  007772  012737  003672  002116          MOV     #NOPWR,WHY
3455  010000  004537  020144                  JSR     R5,DRDRV
3456  010004  000137  010044                  JMP     13$
3457
3458  010010  004537  021062          15$     JSR     R5,ISDRST
3459  010014  004537  022374                  JSR     R5,HDHOME
3460  010020  005064  000056                  CLR     PRFLGS(R4)
3461  010024  005064  000036                  CLR     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          13$     ADD     #PRPOS+2,R4
3466  010050  106302                          ASLB    R2
3467  010052  103323                          BCC     11$
3468  010054  005737  002250                  TST     SYSCLK
3469  010060  001406                          BEQ     4$
3470  010062                                  CLKON   #1
 (3)  010062  012700  000001                  MOV     #1,R0
 (3)  010066  104034                          EMT     C$KWON
3471  010070                                  REQTIM  R0
 (3)  010070  104045                          EMT     C$REQTIM
3472  010072  010037  002224                  MOV     R0,LSTTIM
3473  010076  000137  011046          4$      JMP     POWER
3474  010102                          3$      READEF  #EF.CONTINUE            ;CONTINUE FROM CONSOLE?
 (3)  010102  012700  000036                  MOV     #EF.CONTINUE,R0
 (3)  010106  104050                          EMT     C$REFG
3475  010110                                  BNCOMPLETE      1$              ;NO  CONTINUE W. INIT CODE
 (2)  010110  103004                          BCC     1$
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          1$      JSR     R5,CLEAR                ;CLEAR ALL DRIVE BUFFERS
3481  010126  012737  176543  002124          MOV     #176543,HINUM           ;PRIME RANDOM GENERATOR
3482  010134  012737  123456  002126          MOV     #123456,LONUM           ;  "     "      "
3483  010142  012700  002134          2$      MOV     #CNTLR1,R0              ;CLEAR FLAGS
3484  010146  005020                  CLRDAT  CLR     (R0)+
3485  010150  020027  002270                  CMP     R0,#STFLG+2             ;MASS CLEAR
3486  010154  001374                          BNE     CLRDAT
3487
3488  010156  012704  024752                  MOV     #DRBUF,R4               ;SETUP UP DRIVE BUFFER POINTER
3489  010162  012702  023724                  MOV     #BSECC,R2               ;SETUP BAD SECTOR POINTER
```

```
3490  010166  013703  002014                MOV     L$UNIT,R3               ;GET NUMBER OF UNITS
3491  010172  010337  002260                MOV     R3,UUT                  ;SAVE L$UNIT
3492  010176  005001                       CLR     R1                      ;INIT P-TABLE
3493  010200  005703                1$     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$GPHRD
3496  010210                               BNCOMPLETE      12$
 (2)  010210  103110                       BCC     12$
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     CNTLR1                  ;DO WE HAVE CSR 1 YET?
3502  010236  001011                       BNE     2$                      ;YES,THEN SEE IF IT'S IT
3503  010240  013737  002150  002212        MOV     BPRIOR,PRIOR1
3504  010246  013737  002144  002134        MOV     BCSR,CNTLR1             ;NO,MAKE THIS ONE CSR 1
3505  010254  013737  002146  002206        MOV     BVEC,VECT1              ;MAKE THIS VECTOR VECT1
3506  010262  023737  002144  002134  2$    CMP     BCSR,CNTLR1             ;IS THIS CSR CNTLR1?
3507  010270  001012                       BNE     5$                      ;NO,GO CHECK AGAINST #2
3508  010272  023737  002146  002206        CMP     BVEC,VECT1              ;IS VECTOR PROPER?
3509  010300  001050                       BNE     10$                     ;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      11$                     ;GO GET NEXT P-TABLE
3513  010316  005737  002136          5$    TST     CNTLR2                  ;HAVE WE GOT CSR #2 YET?
3514  010322  001015                       BNE     6$                      ;YES, CHECK THIS ONE AGAINST IT
3515  010324  023737  002206  002144        CMP     VECT1 BCSR              ;IS THIS VECTOR SAME AS CNTLR1
3516  010332  001433                       BEQ     10$                     ;IFSO, DON'T ALLOW IT
3517  010334  013737  002144  002136        MOV     BCSR,CNTLR2             ;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  6$    CMP     BCSR,CNTLR2             ;IS THIS CSR # 2?
3521  010364  001016                       BNE     10$                     ;NO, WELL WE DON'T ALLOW 3
3522  010366  023737  002146  002210        CMP     BVEC,VECT2              ;DOES IT HAVE PROPER VECTOR
3523  010374  001012                       BNE     10$                     ;NO, GO REPORT ERROR
3524  010376  023737  002210  002206        CMP     VECT2,VECT1             ;IS VECTOR OF FIRST EQUAL TO
3525  010404  001406                       BEQ     10$                      VECTOR OF SECOND, YES REPORT ERROR
3526  010406  012737  002254  002164        MOV     #BUF2,TEMP1             ;OTHER CNTLR/OTHER BUFFER
3527  010414  004537  011424                JSR     R5,FILINF               ;LOAD BUFFER
3528  010420  000406                       BR      11$                     ;NEXT
3529  010422                         10$    ERRDF   160,ILLEG,ERR10          BAD P-TABLE
 (3)  010422  104462                       TRAP    T$ERCODE
 (5)  010424  000240                        WORD   160
 (5)  010426  003560                        WORD   ILLEG
 (5)  010430  005100                        WORD   ERR10
3530  010432  005064  000104          12$   CLR     DCS(R4)
3531  010436  005201                11$    INC     R1                      ;POINT TO NEXT
3532  010440  005303                       DEC     R3                      ;DOWN COUNT
3533  010442  062702  000040                ADD     #32.,R2                 ;NEXT BAD SECTOR FILE
3534  010446  000654                       BR      1$                      ;DO WHILE
3535
3536
3537  010450                         END
3538
```

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3539  010450  012737  177770  002122          MOV     #177770,SYSMSK          ;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,SYSMSK               ,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,SYSMSK               ,SET FOR ONE OR TWO
3546  010512                          2$      READEF  #EF.START               ,START COMMAND
 (3)  010512  012700  000040                  MOV     #EF.START,R0
 (3)  010516  104050                          EMT     C$REFG
3547  010520                                  BNCOMPLETE      RESTART         ,NO, CHK RESTART
 (2)  010520  103002                          BCC     RESTART
3548  010522  005237  002266                  INC     STFLG                   ,SET START INDICATOR
3549
3550  010526  005737  002270          RESTART         TST     CNTFLG          ,CONTINUING
3551  010532  001024                          BNE     3$                      ,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     C$SVEC
 (2)  010626  062706  000010                  ADD     #10,SP
3572
3573  010632  005737  002136                  TST     CNTLR2                  ,RUNNING TWO CONTROLLERS?
3574  010636  001413                          BEQ     4$                      ,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     C$SVEC
 (2)  010662  062706  000010                  ADD     #10,SP
3577
3578  010666  005737  002270          4$      TST     CNTFLG                  ,CONTINUE?
3579  010672  001412                          BEQ     FINDBF                  ,NO, GO PAST RESTART OF CLOCK
```

```
3580
3581  010674  005737  002250          TST     SYSCLK                  ,DO WE HAVE SYSTEM CLOCK
3582  010700  001462                  BEQ     POWER                   ;NO
3583
3584  010702                          CLKON   #1                      ,TURN CLK ON
 (3)  010702  012700  000001          MOV     #1,R0
 (3)  010706  104034                  EMT     C$KWON
3585  010710                          REQTIM  R0                      ,REQUEST TIME
 (3)  010710  104045                  EMT     C$REQTIM
3586  010712  010037  002224          MOV     R0,LSTTIM               ,MAKE IT PRESENT TIME
3587  010716  000453                  BR      POWER                   ,GO TO END
3588
3589
3590  010720  012703  000050  FINDBF  MOV     #40 ,R3         ,MAXIMUM SECTOR IS 40
3591  010724  005001                  CLR     R1                      ,START WC AT ZERO
3592  010726  005737  002136          TST     CNTLR2                  ;TWO CONTROLLERS????
3593  010732  001402                  BEQ     1$                      ,NO, START WC AT 5120
3594  010734  012701  000024          MOV     #20 ,R1                 ;20 256 WORD BUFFERS
3595  010740  062701  000024  1$      ADD     #20 ,R1                 ;WC TO 5120 PLUS 5120
3596  010744                  2$      BUFFER  R1,R2           ,GET BUFFER IF AVAILABLE
 (3)  010744  010100                  MOV     R1,R0
 (3)  010746  104030                  EMT     C$BUFF
 (3)  010750  010002                  MOV     R0,R2
3597  010752                          BCOMPLETE       4$              ,WAS AVAILABLE, THEN BR
 (2)  010752  103411                  BCS     4$
3598  010754  005737  002136          TST     CNTLR2                  ,TWO CONTROLLERS???
3599  010760  001401                  BEQ     3$                      ,NO
3600  010762  005301                  DEC     R1                      ,ONE 256 WORD BUFFER LESS
3601  010764  005301          3$      DEC     R1                      ,ONE MORE LESS
3602  010766  162703  000002          SUB     #2,R3
3603  010772  001364                  BNE     2$                      ,IF NOT ZERO GO BACK
3604
3605  010774  000000                  HALT
3606
3607  010776  042701  177400  4$      BIC     #177400,R1
3608  011002  000301                  SWAB    R1
3609  011004  010237  002252          MOV     R2,BUF1                 ,GET BUFFER FOR FIRST CONTROLLER
3610  011010  005737  002136          TST     CNTLR2                  ,TWO CONTROLLERS??
3611  011014  001404                  BEQ     5$                      ,NO
3612  011016  060102                  ADD     R1,R2                   ;SECOND'S BUFFER
3613  011020  010237  002254          MOV     R2,BUF2
3614  011024  006201                  ASR     R1                      ,CORRECT WORD COUNT
3615  011026  010137  002256  5$      MOV     R1,MAXWC                ,MAX WORD COUNT
3616
3617
3618
3619  011032                  7$      CLKON   #1                      ,TURN CLOCK ON?
 (3)  011032  012700  000001          MOV     #1,R0
 (3)  011036  104034                  EMT     C$KWON
3620  011040                          BNCOMPLETE      POWER           ,WAS THERE A CLOCK?
 (2)  011040  103002                  BCC     POWER
3621
3622  011042  005237  002250          INC     SYSCLK                  YES. SET FLAG FOR ONE!
3623
3624  011046                  POWER
3625
```

```
3626
3627
3628  011046                                    ENDINIT
 (3)  011046                              L10016
 (3)  011046  104011                       EMT     C$INIT
3629
3630  011050                                    ENDMOD
3631
3632  011050                              BGNMOD  CLNCODE
3633
3634
3635  011050                                    BGNCLN
3636
3637  011050                                    SETVEC  ERRVEC,#TRPHAN,#340
 (7)  011050  012746  000340                    MOV     #340,-(SP)
 (6)  011054  012746  011626                    MOV     #TRPHAN,-(SP)
 (5)  011060  013746  002302                    MOV     ERRVEC,-(SP)
 (4)  011064  012746  000003                    MOV     #3,-(SP)
 (3)  011070  104037                            EMT     C$SVEC
 (2)  011072  062706  000010                    ADD     #10,SP
3638  011076                                    SETPRI  #PR100                  ;PRIORITY TO ZERO
 (3)  011076  012700  000000                    MOV     #PR100,R0
 (3)  011102  104041                            EMT     C$SPRI
3639
3640  011104  032777  000200  170022  1$        BIT     #CRDY,@CNTLR1           ;WAIT FOR CONTROLLER TO FINISH
3641  011112  001774                            BEQ     1$                      ;
3642  011114  042777  000100  170012            BIC     #INTEN,@CNTLR1          ;CLEAR INTERRUPT IF PENDING
3643  011122                                    CLRVEC  VECT1                   ;RELEASE VECTOR OF FIRST CONTROLLER
 (3)  011122  013700  002206                    MOV     VECT1,R0
 (3)  011126  104036                            EMT     C$CVEC
3644
3645  011130  005737  002136                    TST     CNTLR2                  ;TWO CONTROLLERS
3646  011134  001412                            BEQ     3$                      ;NO
3647
3648  011136  032777  000200  170772  2$        BIT     #CRDY,@CNTLR2           ;WAIT FOR OTHER CONTROLLER TO FINISH
3649  011144  001774                            BEQ     2$
3650  011146  042777  000100  170762            BIC     #INTEN,@CNTLR2          ;CLEAR OUT INTERRUPT ENABLE
3651  011154                                    CLRVEC  VECT2                   ;YES  WELL RELEASE IT'S VECTOR
 (3)  011154  013700  002210                    MOV     VECT2,R0
 (3)  011160  104036                            EMT     C$CVEC
3652
3653  011162  005037  002312            3$      CLR     INCALL
3654  011166  005037  002310                    CLR     OPCALL
3655  011172                                    CLRVEC  ERRVEC
 (3)  011172  013700  002302                    MOV     ERRVEC R0
 (3)  011176  104036                            EMT     C$CVEC
3656
3657  011200                                    ENDCLN
 (3)  011200                              L10017
 (3)  011200  104012                       EMT     C$CLEAN
3658
3659  011202                                    ENDMOD
3660
3661
3662  011202                              BGNMOD  ADDCODE
3663
```

```
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                  1$      TST     R0                      ;THIS ONE
3670  011216  001405                          BEQ     2$                      ;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      1$
3675  011232  150137  002120          2$      BISB    R1,DRUT                 ;INSERT IN DRIVE UNDER TEST
3676  011236                                  GPHARD  R2,R1
 (3)  011236  010200                          MOV     R2,R0
 (3)  011240  104042                          EMT     C$GPHRD
 (3)  011242  010001                          MOV     R0,R1
3677  011244  011164  000104                  MOV     (R1),DCS(R4)
3678  011250  012700  000100                  MOV     #SERNM1,R0              ;SETUP TO CLEAR STATS
3679  011254  006200                          ASR     R0
3680  011256  005024                  4$      CLR     (R4)+
3681  011260  005300                          DEC     R0
3682  011262  001375                          BNE     4$
3683  011264                          5$
3684
3685  011264                          ENDAU
 (3)  011264                          L10020
 (3)  011264  104054                          EMT     C$AU
3686
3687  011266                          ENDMOD
3688
3689  011266                          BGNMOD  DRVPCODE
3690
3691  011266                          BGNDU
3692
3693  011266  005737  002312                  TST     INCALL
3694  011272  001015                          BNE     3$
3695  011274  012704  024752                  MOV     #DRBUF,R4
3696  011300  005700                  2$      TST     R0
3697  011302  001404                          BEQ     1$
3698  011304  005300                          DEC     R0
3699  011306  062704  000122                  ADD     #PRPOS+2,R4
3700  011312  000772                          BR      2$
3701
3702  011314  012737  007277  002116  1$      MOV     #REQ,WHY
3703  011322  004537  020140                  JSR     R5,QDRDRV
3704  011326                          3$
3705
3706
3707  011326                          ENDDU
 (3)  011326                          L10021
 (3)  011326  104055                          EMT     C$DU
3708
3709  011330                          ENDMOD
3710
3711                                   SBTTL   GLOBAL SUBROUTINES
3712
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```
3713  011330                          BGNMOD  GLBSUB
3714
3715  011330  012701  000010          SETWCK  MOV     #8 ,R1
3716  011334  012702  024752                  MOV     #DRBUF,R2
3717  011340  026462  000104  000104  1$      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,BSECPT(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     C$SVEC
 (2)  011506  062706  000010                  ADD     #10,SP
3747  011512  005774  000104                  TST     @DCS(R4)
3748  011516  005737  002264                  TST     TRPFLG                  ;DID TRAP OCCUR
3749  011522  001012                          BNE     3$                      ;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
```

```
  (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,#MRLCS,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 PLNN 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$PNTS
  (4) 011776  062706  000004            ADD     #4,SP
3779  012002                        2$
3780  012002                            PRINTS  #FMTS2,#CART,SERNM2(R4),SERNM1(R4
```

```
   (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$PNTS
   (4)  012132  062706  000012          ADD     #12,SP
  3783  012136                          PRINTS  #FMTS3,DERCNT(R4),SKECNT(R4),TREPR(R4),DATCER(R4)
   (11) 012136  016446  000074          MOV     DATCER(R4),-(SP)
   (10) 012142  016446  000072          MOV     TRERR(R4),-(SP)
   (9)  012146  016446  000016          MOV     SKECNT(R4),-(SP)
   (8)  012152  016446  000020          MOV     DERCNT(R4),-(SP)
   (7)  012156  012746  007174          MOV     #FMTS3,-(SP)
   (6)  012162  012746  000005          MOV     #5,-(SP)
   (3)  012166  010600                  MOV     SP,R0
   (4)  012170  104016                  EMT     C$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$PNTS
   (4)  012222  062706  000010          ADD     #10,SP
  3785  012226                          PRINTS  #FMTS4,DCRCER(R4),HCRCER(R4),NXMCNT(R4),HNFERR(R4)
   (11) 012226  016446  000032          MOV     HNFERR(R4),-(SP)
   (10) 012232  016446  000034          MOV     NXMCNT(R4),-(SP)
   (9)  012236  016446  000024          MOV     HCRCER(R4),-(SP)
   (8)  012242  016446  000022          MOV     DCRCER(R4),-(SP)
   (7)  012246  012746  007330          MOV     #FMTS4,-(SP)
   (6)  012252  012746  000005          MOV     #5,-(SP)
   (3)  012256  010600                  MOV     SP,R0
   (4)  012260  104016                  EMT     C$PNTS
   (4)  012262  062706  000014          ADD     #14,SP
```

```
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 PARAMETERS FOR THE DRIVE
3804
3805  012320  005767  177776          MTEST   TST     PWRFLG
```

```
3E07  012324  001054                    BNE     12$                 ,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        16$     BITB    R1,DRUT                 ;DRIVE UNDER TEST
 3812  012342  001441                        BEQ     15$                     ,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                13$     DEC     R0
 3818  012366  001376                        BNE     13$
```

```
 3820  012370  032774  000001  000104          BIT     #DRDY,@DCS(R4)
 3821  012376  001006                          BNE     14$
 3822
 3823  012400  012737  002460  002116          MOV     #DNRDY,WHY
 3824  012406  004537  020144                  JSR     R5,DRDRV
 3825  012412  000415                          BR      15$
 3826
 3827  012414  004537  017432          14$     JSR     R5,RDBDSC               ;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                  JSR     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,R0
  (4)  012474  104017                          EMT     C$SPNTF
  (4)  012476  062706  000006                  ADD     #6,SP
 3841  012502                          SETPRI  #0                      ;PRIORITY TO ZERO
  (3)  012502  012700  000000                  MOV     #0,R0
  (3)  012506  104041                          EMT     C$SPRI
 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     SYSMSK,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  012550                                  ERRSF   170,NODRIV              ;NO DRIVES
  (3)  012550  104421                          TRAP    T$ERCODE
  (5)  012552  000252                           WORD   170
  (5)  012554  003606                           WORD   NODRIV
 3855
 3856  012556  000137  024744                  JMP     ENDOFPROGRAM
 3857
 3858  012562  130137  002120          5$      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 CONTROLLER
 3862                                  ;IS FREE BEFORE WE GO ANY FURTHER
 3863
 3864
```

```
 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     C$DRPT
 3872
 3873  012612  012704  024752          6$     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     SYSMSK,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  002134         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.  R4 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),R4    ;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     RETRY(R4)       ;DOES DRIVE HAVE RETRY 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     79$             ;NO
 3911  012770  000412                         BR      GETFNC          ;NO  CONTINUE
 3912  012772  000137  013732                 JMP     PDDFNC          ;GO READ
 3913  012776  032764  000001  000056  79$    BIT     #SKDON,PPFLGS(R4)  ;SEEK BEEN VERIFIED
 3914  013004  001002                         BNE     79$             ;NO
 3915  013006  000137  013324                 JMP     SKFNC           ;GO, TRY TO RECOVER
 3916  013012  000137  013650          79$    JMP     RDHFNC          ;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     1$                      ;NO, CONTINUE
3922  013026  000137  013650                  JMP     RDHFNC                  ;GO VERIFY SEEK
3923  013032  005737  007532          1$      TST     T DRP                   ;DROP ON ERROR LIMITS REACHED?
3924  013036  001456                          BEQ     8$                      ;NO
3925  013040  026437  000012  007472          CMP     ERRCNT(R4),ERLMT        ;HARD REACHED?
3926  013046  103404                          BLO     9$
3927  013050  012737  003111  002116          MOV     #ERLMTM,WHY
3928  013056  000442                          BR      11$
3929  013060  026437  000014  007536  9$      CMP     SFTCNT(R4),SFLMT        ;SOFT REACHED?
3930  013066  103404                          BLO     10$
3931  013070  012737  003154  002116          MOV     #SFEMSG,WHY
3932  013076  000432                          BR      11$
3933  013100  026437  000074  007564  10$     CMP     DATCER(R4),T DCD
3934  013106  103404                          BLO     110$
3935  013110  012737  003176  002116          MOV     #DCDMSG,WHY
3936  013116  000422                          BR      11$
3937  013120  016401  000016          110$    MOV     SKECNT(R4),R1
3938  013124  066401  000072                  ADD     TRERR(R4),R1
3939  013130  020137  007474                  CMP     R1,SELMT
3940  013134  103404                          BLO     7$
3941  013136  012737  003133  002116          MOV     #SERLMT,WHY
3942  013144  000407                          BR      11$
3943  013146  026437  000020  007542  7$      CMP     DERCNT(R4),DRLMT        ;DRIVE ERROR REACHED?
3944  013154  103407                          BLO     8$
3945  013156  012737  003221  002116          MOV     #DERMSG,WHY
3946  013164  004537  020144          11$     JSR     R5,DRDRV                ;DROP THIS DRIVE!!!
3947  013170  000137  012510                  JMP     MAIN                    ;GO GET ANOTHER
3948
3949
3950
3951
3952  013174  005737  007540          8$      TST     T STA                   ;DO WE WISH TO DROP ON OPR LIMITS
3953  013200  001422                          BEQ     98$                     ;NO
3954
3955  013202  026437  000000  007500          CMP     SKCNT(R4),SKLMT         ;PAST THE SEEK LIMIT?
3956  013210  103416                          BLO     98$                     ;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     98$                     ;NO, THEN GO TEST
3961  013230  012737  003400  002116          MOV     #SOPLMT,WHY
3962  013236  004537  020144                  JSR     R5,DRDRV                ;DROP THE DRIVE
3963  013242  000137  012510                  JMP     MAIN                    ;GO FOR ANOTHER DRIVE
3964
3965  013246  004537  021140          98$     JSR     R5,FUNC                 ;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,R2                ;GET IT
3974  013256  042702  177770                  BIC     #177770,R2              ;MASK TO 0-7
3975  013262  001001                          BNE     6$                      ;IF 0  MAKE 1
```

```
  3976  013264  005202                        INC     R2
  3977  013266  022702  000007          6$    CMP     #7,R2           ,IS IT 7?
  3978  013272  001001                        BNE     5$              ,IF 7, MAKE 6
  3979  013274  005302                        DEC     R2
  3980  013276  006302                  5$    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,BDA(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          SKFNC   TST     RSEEK(R4)  ,TRYING TO RECOVER
  4000  013330  001411                        BEQ     98$             ,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 LATER
  4004  013346  042702  000100                BIC     #100,R2         ,
  4005  013352  000507                        BR      4$              ,SKIP RANDOM PART
  4006  013354  004537  021140          95$   JSR     R5,RAND         ,GET A RANDOM NUMBER
  4007  013360  013702  002126                MOV     LONUM,R2        ,
  4008  013364  043702  002132                BIC     SECMSK,R2        LEAVE CYL AND HEAD
  4009  013370  020264  000120                CMP     R2,PRPOS(R4     ,ON THAT TRACK ALREADY
  4010  013374  001002                        BNE     90$              NO, CONTINUE
```

```
4012  013376  000137  013016                JMP     GETFNC          ,YES, DON'T RESEEK
4013  013402  005003                  90$   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     95$             ,NO, BRANCH AND STAY IN LIMITS
4018  013422  013702  007520                MOV     T MXC,R2        ,MAKE CYLINDER MAX/MIN
4019  013426  000430                        BR      92$             ,GO CLCULATE DIFF AND SEEK
4020  013430  042702  000100          95$   BIC     #HEAD,R2        ,STRIP OUT H S  BIT
4021  013434  023702  007520          94$   CMP     T MXC,R2        ,IS ADDRESS LESS/EQUAL THAN MAX
4022  013440  103010                        BHIS    93$             ,YES, CHECK LOW END
4023  013442  005203                        INC     R3
4024  013444  020327  000012                CMP     R3,#10
4025  013450  001741                        BEQ     98$
4026  013452  006202                        ASR     R2              ,HALF IT AND CHECK AGAIN
4027  013454  062702  000200          91$   ADD     #BIT7,R2        ,JUST TO MAKE NON ZERO
4028  013460  000763                        BR      95$             ,GO BACK AND CHECK AGAIN
4029  013462  023702  007522          93$   CMP     T MNC R2        ,IS MIN GREATER/EQUAL THAN ADDRESS
4030  013466  101410                        BLOS    92$             ,YES, CALCULATE DIFF AND SEEK
4031  013470  005203                        INC     R3
4032  013472  020327  000012                CMP     R3,#10
4033  013476  001726                        BEQ     98$
4034  013500  006302                        ASL     R2              ,NO, DOUBLE IT
4035  013502  042702  100000                BIC     #BIT15,R2       ,BIT 15 CAN'T SET
4036  013506  000762                        BR      91$             ,GO CHECK MAX/MIN AGAIN
4037  013510  016401  000120          92$   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  000050        MOV     PRPOS(R4),LSTHDR(R4)    ,SAVE LAST
4041  013526  010264  000120                MOV     R2,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     96$             ,NO, THEN WE CAN USE BOTH SURFACES
4045  013546  005737  007514                TST     T MXH           ,WHICH IS OUR SURFACE FOR USE
4046  013552  001004                        BNE     97$             ,TOP SURFACE BRANCH
4047  013554  042764  000100  000120        BIC     #HEAD,PRPOS(R4) ,LOWER SURFACE ONLY
4048  013562  000403                        BR      96$
4049  013564  052764  000100  000120  97$   BIS     #HEAD,PRPOS(R4) ,TOP SURFACE ONLY
4050  013572                        96$
4051
4052                                  ;CALCULATE THE DIFFERENCE WORD AND STORE IT IN BDA
4053
4054
4055  013572  160102                  4$    SUB     R1 R2           ,SUBTRACT PRESENT FROM NEXT
4056  013574  100002                        BPL     1$              ,IF POSITIVE RESULT GO TO 1$
4057  013576  005402                        NEG     R2              ,NEG RESULT, NEGATE IT
4058  013600  000402                        BR      2$              ,GO SET DIRECTION OUT
4059  013602  052702  000004            1$  BIS     #SIGN,R2        ,DIRECTION OUT, MARKER
4060  013606  052702  000001            2$  BIS     #MK,R2          ,MARKER BIT
4061  013612  032764  000100  000120        BIT     #HEAD,PRPOS(R4) ,WHICH SURFACE SELECTED?
4062  013620  001402                        BEQ     3$              ,TOP, THEN 3$
4063  013622  052702  000020                BIS     #SKHS,R2        ,BOTTOM SET HEAD BIT
4064  013626  010264  000040            3$  MOV     R2,BDA(R4)      ,MOVE DIFFERENCE WORD TO DA
4065  013632  010264  000066                MOV     R2,DIFWD(R4)    ,LOAD DIFFERENCE WORD
4066  013636  012764  000006  000044        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,GWCDA          ;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,GWCDA          ;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 STORE OFF THE DRIVE BUFFER
4122                                     POINTER IN IT'S "LSTDR"
4123
```

```
4124
4125  014002  026437  000104  002134  ISSUE   CMP     DCS(R4),CNTLR1  ;DRIVE ON CONTROLLER 1?
4126  014010  001003                          BNE     1$              ,NO, ASSUME ON CONTROLLER 2
4127  014012  010437  002140                  MOV     R4,LSTDR1       ,PUT BUFFER POINTER IN 1
4128  014016  000402                          BR      2$              ,SKIP OVER NEXT INSTRUCTION
4129  014020  010437  002142          1$      MOV     R4,LSTDR2       ,PUT BUFFER POINTER IN 2
4130  014024  052764  000100  000044  2$      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     R5,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     1$              ,YES, GO ISSUE COMMAND
4144
4145  014054                                  ERRSF   200 ,PRGER      ,THIS ERROR SHOULD NEVER PRINT
 (3)  014054  104421                          TRAP    TSERCODE
 (5)  014056  000310                           WORD   200
 (5)  014060  002521                           WORD   PRGER
4146
4147  014062  017463  000110  000002  1$      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  INTERRUPT SERVICE ROUTINES
4159
4160  014152                  BGNSRV  INTR1
4161
4162
4163                           ON INTERRUPT WE CHECK FOR ERRORS FIRST. IF NO ERRORS WE
4164                           CHECK FUNCTION PREFORMED  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 RETRY
4173                           LIMIT IF RETRY IS LESS THEN LIMIT THEN LOG SOFT ERROR, CLEAR RETRY
4174                           IF RETRY = 0, THEN NOTHING
4175
4176                          ;ON ERRORS - IF DRIVE ERROR - UNDEF NON-INTERRUPT
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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 CSR 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     1$              ;YES, GO SOLVE ERROR MYSTERY
4225  014336  000137  015456                    JMP     CHKFNC          ;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  1$      MOV     E DA,LSTDA(R4)  ;SAVE DA FOR SOFT ERROR PRINT
```

```
 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                                  ERRDF   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,RTYPE(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                                  ERRSF   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,RTYPE(R4);SET UP FOR "OPI" PRINT
 4266  014522  005264  000030                  INC     OPICNT(R4)      ,LOG ERROR
 4267  014526  000555                          BR      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,RTYPE(R4),SET UP FOR "DLT"PRINT
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4280  014556  005264  000026                  INC     DLTCNT(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     DCRCER(R4)          ,ACCOUNT FOR ERROR
4290  014620  012764  004120  000052          MOV     #MTDCRC,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 MISSEEK, 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(R3)              ,DAY, IS ERROR 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     SECMSK,R1           ,MASK OUT SECTOR BITS
4326  014766  020164  000120                  CMP     R1,PRPOS(R4)        ,IS CYLINDER HEAD CORRECT?
4327  014772  001415                          BEQ     10$                 ,YES, GO CHECK BAD SECTOR LIST
4328
4329
```

```
 4330  014774  005264  000072                 INC     TRERR(R4)
 4331  015000                                 ERRHRD  20 ,TRACK,ERR2  ,TRACKING DRIFT ERROR
  (3)  015000  104463                         TRAP    T$ERCODE
  (5)  015002  000024                          WORD   20
  (5)  015004  003074                          WORD   TRACK
  (5)  015006  004276                          WORD   ERR2
 4332
 4333
 4334  015010  000137  015760                 JMP     SKRETRY         ,FIX TRACKING ERROR
 4335
 4336
 4337  015014                          9$     ERRHRD  30 ,EXHAUS,ERR1 ,WE CAN'T FIND GOOD HEADER ON THIS TRACK
  (3)  015014  104463                         TRAP    T$ERCODE
  (5)  015016  000036                          WORD   30
  (5)  015020  002562                          WORD   EXHAUS
  (5)  015022  004270                          WORD   ERR1
 4338
 4339  015024  000410                         BR      110$
 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     #INTEN!RDHDR,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     HCRCER(R4)      ,LOG ERROR
 4367  015122  012764  004112  000052         MOV     #MTHCRC,RTYPE(R4)
 4368  015130  000550                         BR      GOFIN
 4369
 4370  015132  017401  000110         13$     MOV     @BBA(R4),R1     ,USE IT'S BUFFER TO STORE HDRS
 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           ,DONE 40 YET?
4382  015214  001353                      BNE     14$             ,NO, GO BACK
4383
4384                                  ,WE HAVE 40 HEADERS NOW LETS SEE IF WE CAN VERIFY WHETHER
4385                                  ,OR NOT A BAD SECTOR CAUSED THE ERROR   CHECK FIRST TO SEE
4386                                  ,IF WE HAVE ANY BAD SECTORS ON THIS TRACK
4387
4388  015216  017402  000110        99$     MOV     @BBA(R4),R2     ,GET BUFFER START
4389  015222  012701  000050              MOV     #40 ,R1         ;FOURTY HEADERS         :
4390  015226  032712  002000        15$     BIT     #OPI,(R2)       ,IS OPI SET IN CS
4391  015232  001403                      BEQ     16$             ,NO, WELL CAN'T BE HCRC
4392  015234  032712  004000              BIT     #HCRC,(R2)      ,INSURE HCRC W/OPI
4393  015240  001005                      BNE     17$             ,FOUND GO SEE IF IT COMPARES
4394  015242  062702  000010        16$     ADD     #10,R2          ,NEXT CS IMAGE
4395  015246  005301                      DEC     R1              ,DONE 40
4396  015250  001366                      BNE     15$
4397  015252  000721                      BR      12$
4398
4399  015254  020274  000110        17$     CMP     R2,@BBA(R4)     ,IS HEADER FIRST ONE?
4400  015260  001046                      BNE     21$             ,NO, READ PREVIOUS HEADER
4401                                                              ,YES, WE'LL HAVE TO GO THRU
4402                                                              ,AND CHECK OTHERS BEFORE WE
4403                                                               CAN SAFELY CALCULATE
4404                                                               "SUPPOSED" BAD SECTOR
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     #MBDMSG,WHY     DROP DRIVE DUE TO
4418  015330  004537  020144              JSR     R5,DRDRV        MORE THAN 16 BAD SECTORS
4419  015334  000137  016270              JMP     EXIT1
4420
4421
4422  015340  005012                21$   CLR     (R2)            CLEAR THIS CS
4423  015342  062701  000002              ADD     #2 R1           ,GET IT'S HEADER ADDRESS
4424  015346  011102                      MOV     (R1),R2          GET HEADER
4425  015350  010201                      MOV     R2,R1           ,SAVE HEADER
4426  015352  042702  177700              BIC     #177700,R2      ,MASK   ONLY SECTOR
4427  015356  160301                      SUB     R3,R1           ,BACK UP TO SECTOR WHICH IS BAD
4428  015360  100402                      BMI     20$             ,IF MINUS DO MAGIC
4429  015362  160302                      SUB     R3,R2           ,NO THEN SUBTRACT IS LEGAL
4430  015364  000421                      BR      22$             ,BRANCH TO CHECK FILE
4431  015366  160302                20$   SUB     R3,R2           ,THIS SUB PRODUCES WRONG ANSWER
4432  015370  062702  000050              ADD     #50 R2          ,FIX IT UP
4433  015374  000415                      BR      22$              GO CHECK FILE
```

```
4434
4435  015376  005012                  21$     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     22$
4443  015424  162702  000050                  SUB     #40 ,R2
4444  015430  010237  002156          22$     MOV     R2,CHKSEC
4445  015434  004537  023640                  JSR     R5,CKBDSC
4446  015440  005737  002154                  TST     HDRFND
4447  015444  001664                          BEQ     99$
4448  015446  000137  016274          GOERRX  JMP     ERREX
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                                     NTERRUPT AND ACT ACCORDINGLY
4462
4463
4464  015456  016401  000044          CHKFNC  MOV     FUNC(R4),R1     ;GET FUNCTION OF DRIVE
4465  015462  006201                          ASR     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     2$              ,NO, BRANCH
4469  015474  004537  011366                  JSR     R5,CLRWCH
4470  015500  000137  016236                  JMP     EXIT
4471  015504  005301                  2$      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     ARDHDP          ,BRANCH IF SO
4477  015520  005301                          DEC     R1              ,WRITE?
4478  015522  001002                          BNE     1$              ,NO, BRANCH
4479  015524  000137  016146                  JMP     AWRITE
4480  015530  005301                  1$      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$SPRI
 4501  015614  004537  020424          JSR     R5,CKDATA           ;CHECK DATA
 4502  015620                          AFWRCK
 4503  015620  016401  000042          1$      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          ARDHDR  MOV     EMP,R1      ;GET HEADER
 4519  015704  043701  002132          BIC     SECMSK,R1           ;MASK OUT SECTOR BITS
 4520  015710  026401  000120          CMP     PRPOS(R4),R1        ;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     SKECNT(R4)          ;ACCOUNT FOR SEEK ERROR
 4527  015732                          ERRHRD  50,MSKER,ERR2
  (3)  015732  104463                  TRAP    TSERCODE
  (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    TSERCODE
  (5)  015752  000067                  .WORD   55
  (5)  015754  003074                  .WORD   TRACK
  (5)  015756  004276                  .WORD   ERR2
 4532
```

```
 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    T$ERCODF
  (5)  015776    000515                           WORD   333
  (5)  016000    003312                           WORD   SEXHAU
  (5)  016002    004276                           WORD   ERR2
 4540  016004    000406                          BR      1$
 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                  CLR     RSEEK(R4)
 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 ROF            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                                    ERRHRD  60 ,MDSER,ERR4
  (3)  016076    104463                          TRAP    T$ERCODE
  (5)  016100    000074                           WORD   60
  (5)  016102    002705                           WORD   MDSER
  (5)  016104    004500                           WORD   ERR4
 4562
 4563  016106    010102          1$      MOV     R1,R2           ,COPY STATUS WORD
 4564  016110    042702  177700                  BIC     #177700,R2      GET STATE BITS
 4565  016114    022702  000034                  CMP     #34,R2          COVER CLSD, HEADS OUT, BRUSHES HOME, SEEK TRACK COUNTIN
 4566  016120    001446                          BEQ     EXIT            ;YES, EXIT
 4567  016122    022702  000035                  CMP     #35,R2          COVER CLSD  HEADS OUT  BRUSHES HOME, SEEK LINEAR MODE
 4568  016126    001443                          BEQ     EXIT            ;ES, EXIT
 4569
 4570  016130    005264  000012                  INC     ERRCNT(R4)
 4571  016134                                    ERRHRD  70 ,MDSER,ERR4
  (3)  016134    104463                          TRAP    T$ERCODE
  (5)  016136    000106                           WORD   70
  (5)  016140    002705                           WORD   MDSER
  (5)  016142    004500                           WORD   ERR4
 4572
 4573  016144    000434                          BR      EXIT
 4574
 4575                                SBTTL                   WRITE
 4576
```

```
 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(R4),#MTDRV
 4595  016252  001406                          BEQ     EXIT1
 4596  016254  005264  000014                  INC     SFTCNT(R4)      ;YES, LOG SOFT ERROR
 4597
 4598  016260                                  ERRSOFT 80.,MSFER,ERR3  ;REPORT SOFT ERROR
  (3)  016260  104464                          TRAP    T$ERCODE
  (5)  016262  000120                          .WORD   80
  (5)  016264  002631                          .WORD   MSFER
  (5)  016266  004362                          .WORD   ERR3
 4599
 4600  016270  005064  000036          EXIT1   CLR     RETRY(R4)       ;CLEAR RETRY
 4601
 4602  016274  042764  000100  000134  ERREX   BIC     #INTEN,@DCSR(R4)
 4603  016302  012600                          MOV     (SP)+,R0
 4604  016304  012601                          MOV     (SP)+,R1
 4605  016306  012602                          MOV     (SP)+,R2
 4606  016310  012603                          MOV     (SP)+,R3
 4607  016312  012637  002312                  MOV     (SP)+,INCALL
 4608  016316  012637  002310                  MOV     (SP)+,OPCALL
 4609  016322  012637  002116                  MOV     (SP)+,WHY
 4610  016326  012637  002164                  MOV     (SP)+,TEMP1
 4611  016332  012637  002154                  MOV     (SP)+,HDRFND
 4612  016336  012637  002156                  MOV     (SP)+,CHKSEC
 4613  016342  012637  002246                  MOV     (SP)+,E.MP2
 4614  016346  012637  002244                  MOV     (SP)+,E.MP1
 4615  016352  012637  002242                  MOV     (SP)+,E.MP
 4616  016356  012637  002240                  MOV     (SP)+,E.DA
 4617  016362  012637  002236                  MOV     (SP)+,E.BA
 4618  016366  012637  002234                  MOV     (SP)+,E.CS
 4619  016372  012604                          MOV     (SP)+,R4
 4620  016374                                  ENDSRV
  (3)  016374                          L10023
  (2)  016374  000002                          RTI
 4621
 4622  016376  004537  017374          FINERR  JSR     R5,RCNT         ;CHECK TO SEE IF WE HAVE EXCEEDED
 4623  016402  000405                          BR      1$              ;RETRY LIMIT. IF SO 1$ 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          1$      INC     ERRCNT(R4)      ;INDICATE ERROR
```

```
4627
4628  016422                                ERRHRD  90,MHDER,ERR1  ;NON-RECOVERABLE ERROR
 (3)  016422  104463                        TRAP    T$ERCODE
 (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                                 $BTTL  DRIVE ERROR SERVICE
4634
4635                                ;WE HAVE A DRIVE ERROR. LET'S GET THE STATUS
4636
4637  016440  005264  000020        CKDERR  INC     DERCNT(R4)      ;ACCOUNT FOR ERROR
4638  016444  004537  021046                JSR     R5,GETDST       ;GET DRIVE STATUS
4639                                ;REPORT DRIVE ERROR
4640  016450                                ERRHRD  224,DRVER,ERR9  ;DRIVE ERROR
 (3)  016450  104463                        TRAP    T$ERCODE
 (5)  016452  000340                         WORD   224
 (5)  016454  002650                         WORD   DRVER
 (5)  016456  005034                         WORD   ERR9
4641
4642                                 ACT ACCORDINGLY TO DRIVE ERROR
4643
4644  016460  032701  001000                BIT     #VC,R1          ;VOLUME CHECK?
4645  016464  001027                        BNE     9$              ;YES, GO ISSUE RESET
4646  016466  032701  010000                BIT     #SKTO,R1        ;SEEK TIME OUT?
4647  016472  001070                        BNE     12$             ;YES, ISSUE RESET
4648  016474  032701  144000                BIT     #WDE!HCE!SPE,R1 ;WRITE DATA, CURRENT HEAD, SPINDLE?
4649  016500  001130                        BNE     15$             ;GO WAIT FOR HEADS TO UNLOAD
4650  016502  032701  002000                BIT     #WGE,R1         ;WRITE GATE ERROR
4651  016506  001003                        BNE     20$             ; YES, ISSUE  RESET
4652  016510  004537  021062                JSR     R5,ISDRST       ;ISSUE RESET
4653  016514  000431                        BR      10$             ;GO CHECK DRIVE READY
4654  016516  004537  021062        20$     JSR     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     10$             ;YES GO CHECK DRIVE READY
4658  016534  012737  002746  002116        MOV     #WGEST,WHY      ;REPORT WGE DIDN'T CLR
4659  016542  000412                        BR      91$             ;DROP DRIVE
4660
4661  016544  004537  021062        9$      JSR     R5,ISDRST       ;ISSUE RESET
4662  016550  004537  021046                JSR     R5,GETDST       ;RESET WORK
4663  016554  032701  001000                BIT     #VC,R1          ;VOL CHK CLEAR
4664  016560  001407                        BEQ     10$             ;YES, CHECK DRIVE READY
4665  016562  012737  002721  002116        MOV     #MVCER,WHY      ; DROP THE DRIVE
4666
4667  016570  004537  020144        91$     JSR     R5,DRDRV
4668  016574  000137  016270                JMP     EXIT1
4669  016600  032763  000001  000000  10$   BIT     #DRDY,CS(R3)    ;DRIVE READY POSTED?
4670  016606  001004                        BNE     101$            ;YES, PRINT RECOVERED
4671
4672  016610  012737  002460  002116        MOV     #DNRDY,WHY
4673  016616  000764                        BR      91$             ;NO. DROP DRIVE
4674
```

```
 4675  016620                                 101$    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$PNTB
  (4)  016640  062706  000006                         ADD     #6,SP
 4676  016644  004537  017102                         JSR     R5,GHDR
 4677  016650  000137  016376                         JMP     FINERR
 4678  016654  012702  000004           12$     MOV     #4,R2           ;SEEK TIME OUT
 4679  016660  004537  021062           13$     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$WTU
 4682
 4683  016672  032763  000001  000000               BIT     #DRDY,CS(R3)    ,DRIVE READY YET?
 4684  016700  001006                               BNE     14$             ,YES, CHECK IF ERROR CLEARED
 4685  016702  005302                               DEC     R2              ,NO, HAVE WE DONE IT FOUR TIMES
 4686  016704  001365                               BNE     13$             ,YET
 4687
 4688  016706  012737  002657  002116   141$    MOV     #MDERS,WHY      ,YES, DROP DRIVE
 4689  016714  000725                               BR      91$
 4690
 4691  016716  032763  040000  000000   14$     BIT     #DEPR,CS(R3)    .DRIVE EPROR SET STILL
 4692  016724  001370                               BNE     141$            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$PNTB
  (4)  016746  062706  000006                         ADD     #6,SP
 4694  016752  004537  017102                         JSR     R5 GHDP
 4695  016756  000137  016236                         JMP     EXIT
 4696
 4697  016762  012702  000004           15$     MOV     #4,R2            WAIT FOR HEADS TO UNLOAD
 4698  016766  004537  021046           16$     JSR     R5,GETDST       ,GET STATUS
 4699  016772  032701  000020                         BIT     #BIT4,R1        ,UNLOAD STATE
 4700  016776  001411                               BEQ     17$              YES, CONTINUE W' RECOVERY
 4701  017000                                     WAITMS  #1               WAIT A WHILE
  (3)  017000  012700  000001                         MOV     #1,R0
  (3)  017004  104026                                 EMT     C$WTM
 4702  017006  005302                               DEC     R2              ,WAIT LONG ENOUGH
 4703  017010  001366                               BNE     16$             ,NO, GO BACK
 4704  017012  012737  003336  002116               MOV     #UNLOAD,WHY     ,DROP DRIVE
 4705  017020  000663                               BR      91$
 4706
 4707  017022  004537  021062           17$     JSR     R5,ISDRST       ,ISSUE RESET
 4708  017026                                     WAITMS  #1              ,
  (3)  017026  012700  000001                         MOV     #1,R0
  (3)  017032  104026                                 EMT     C$WTM
 4709  017034  032763  040000  000000               BIT     #DERR,CS(R3)    .DRIVE ERROR CLEAR?
 4710  017042  001321                               BNE     141$            .NO, DROP DRIVE
 4711  017044  012702  000075                         MOV     #61,R2          ,YES, WAIT 60 SECONDS
 4712  017050                                 18$     WAITMS  #10             .FOR DRIVE READY TO
```

```
   (3)  017050  012700  000012                MOV     #10.,R0
   (3)  017054  104026                        EMT     C$WTM
  4713  017056  032763  000001  000000        BIT     #DRDY,CS(R3)    ;COME BACK
  4714  017064  001314                        BNE     14$             ,
  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     #MTDRV,RTYPE(R4)  ,SETUP DRIVE ERROR
  4729  017150  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     R2              ,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,R3      ,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
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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
4782
4783                                  .SBTTL  RETRY LIMIT ROUTINE
4784
4785                                  ,RETRY BUMP, TWO RETURNS - CALL +2 - RETRY EXCEEDED
4786                                                             CALL +4 - CONTINUE RETRY
4787
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
4793
4794                                  .SBTTL  LIST OF FUNCTION ROUTINES
4795
4796                                  ,WE GO THRU THIS LIST WHEN CALLED IN "GETFNC"
4797                                  .LIST IS IN NUMERICAL ORDER 1-6 (CONTROLLER RESET - READ)
4798
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                          SKFNC                   ,SEEK FUNCTION
4804  017426  013662                          WRTFNC                  ,WRITE DATA
4805  017430  013732                          RDDFNC                  ,READ DATA
4806
4807                                  .SBTTL  BAD SECTOR FILE ROUTINE
4808
4809                                  ,ROUTINE TO RECOVER BAD SECTOR FILE AND SAVE IT FOR
4810                                  ,COMPARISON UPON ERROR ON READS/WRITES   WE WILL ONLY
4811                                  ,RESERVE SPACE FOR 16 BAD SECTORS PER DRIVE
4812                                  ,WE WILL ISSUE A DRIVE RESET FIRST, READ HEADER, POSITION
4813                                  ,TO LAST TRACK (CYLINDER 255, SURFACE 1) AND READ IN
4814                                  ,THE FIRST SECTOR FOR FACTORY BAD, AND THE 20TH FOR
4815                                  ,FIELD BAD SECTORS   R4 WILL CONTAIN THE BUFFER POINTER
4816                                  ,TO THE DRIVE WE WANT TO READ
4817                                  ,
4818                                  .CALL   JSR     R5,RDBDSC
4819
4820
4821  017432  010046                  RDBDSC  MOV     R0,-(SP)        ,SAVE REGISTERS
4822  017434  010146                          MOV     R1,-(SP)
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 4823  017436  010246                          MOV     R2,-(SP)
 4824  017440  010346                          MOV     R3,-(SP)
 4825  017442  004537  021062          21$     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     CYLMSK,R0       ;DIFFERENCE TO GET TO
 4832  017474  012701  077600                  MOV     #77600,R1       ;BAD SECTER 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     #77700,R0
 4845  017564  001326                          BNE     21$
 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     BSECPT(R4),R2   ,INITIALIZE LIST TO ALL 1'S
 4854  017626  012700  000020                  MOV     #16 ,R0         ,SIXTEEN ENTRIES
 4855  017632  012722  177777          11$     MOV     #-1,(R2)+
 4856  017636  005300                          DEC     R0
 4857  017640  001374                          BNE     11$
 4858
 4859  017642  016402  000112                  MOV     BSECPT(R4),R2   ,GET LIST TO STORE
 4860  017646  012700  000020                  MOV     #16 ,R0         ,SIXTEEN ENTRIES
 4861  017652  004537  014042          4$      JSR     R5,LDFUNC
 4862  017656  004537  020776                  JSR     R5,WTRDY
 4863
 4864  017662  005774  000104                  TST     @DCS(R4)        ,WAS THE READ GOOD?
 4865  017666  100025                          BPL     3$              ,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     5$              ,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     4$              ,NO, GO BACK FOR NEXT
 4874  017726  000470                          BR      6$
 4875  017730  026427  000040  077724  5$      CMP     BDA(R4),#77724   AT END OF MANUFACTURING BAD
 4876  017736  001345                          BNE     4$              ,AT END OF BAD FACTORY SECTION
 4877  017740  000463                          BR      6$              ,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     P5,HDHOME       ,BRINGS HEADS HOME
4909  020120  012603                  9$      MOV     (SP)+,R3
4910  020122  012602                          MOV     (SP)+,R2
4911  020124  012601                          MOV     (SP)+,P1
4912  020126  012600                          MOV     (SP)+,P0
4913  020130  000205                          RTS     P5
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          ODRDRV: INC     OPCALL
4932  020144  010146                  DRDRV   MOV     R1 -(SP)
4933  020146  010246                          MOV     R2,-(SP)        ,SAVE REGISTERS
4934  020150  010346                          MOV     R3,-(SP)
```

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 4935  020152  005237  002312                 INC     INCALL
 4936  020156  005003                         CLR     R3
 4937  020160  012702  024752                 MOV     #DRBUF,R2       ;START OF DRIVE BUFFERS
 4938  020164  012701  000001                 MOV     #1,R1           ;MASK
 4939  020170  020402                 1$      CMP     R4,R2           ;IS THIS THE DRIVE?
 4940  020172  001405                         BEQ     2$              ;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      1$              ;GO BACK
 4945
 4946  020206  005737  002310         2$      TST     OPCALL
 4947  020212  001002                         BNE     6$
 4948  020214                                 DODU    R3
  (3)  020214  010300                         MOV     R3,R0
  (3)  020216  104053                         EMT     C$DODU
 4949  020220  005037  002312         6$      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     3$              ;IF MINUTE 0,
 4954  020246  105264  000071                 INCB    DPMIN(R4)       ;MAKE 1
 4955  020252  140137  002120         3$      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     C$PNTF
  (4)  020326  062706  000022                 ADD     #22,SP
 4957  020332                                 PRINTF  #FMT7A,(8,DRSEL+1(R4)),#DROP,WHY
  (10) 020332  013746  002116                 MOV     WHY,-(SP)
  (9)  020336  012746  004067                 MOV     #DROP,-(SP)
  (8)  020342  005046                         CLR     -(SP)
  (8)  020344  156416  000107                 BISB    DRSEL+1(R4),(SP)
  (7)  020350  012746  006125                 MOV     #FMT7A,-(SP)
  (6)  020354  012746  000004                 MOV     #4,-(SP)
  (3)  020360  010600                         MOV     SP,R0
  (4)  020362  104017                         EMT     C$PNTF
  (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     C$PNTF
  (4)  020404  062706  000004                 ADD     #4,SP
 4959
 4960  020410  004737  011634                 JSR     PC,REPORT
 4961
 4962  020414  012603                         MOV     (SP)+,R3
```

```
 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$SPRI
 4976  020442  017402  000110                MOV     @BBA(R4),R2     ;BUFFER START
 4977  020446  016437  000042  002164        MOV     BWP(R4),TEMP1   ;WORDS READ IN
 4978  020454  005437  002164                NEG     TEMP1           ;MAKE POSITIVE
 4979  020460  013737  007506  002166        MOV     DELMT,TEMP2     ;# ERRORS TO BE PRINTED
 4980  020466  005037  002160                CLR     DECNT           ;INIT ERROR COUNT
 4981  020472  013737  007504  002170        MOV     CMRD,TEMP3      ;# WORDS TO BE COMPARED
 4982  020500  012737  000176  002162  96$   MOV     #126.,TEMP0     ;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  024224                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,ERR13
  (3)  020550  104463                        TRAP    T$ERCODE
  (5)  020552  000264                         WORD   180
  (5)  020554  003420                         WORD   NOREV
  (5)  020556  005156                         WORD   ERR13
 5000  020560  004537  027514                JSR     R5,STDMP
 5001  020564  000205                        RTS     R5
 5002
 5003  020566  005301                99$     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 OR ZERO FILL?
 5012  020624  001416                        BEQ     3$              ;ZERO FILL SKIP
```

```
 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          2$      MOV     (R3)+,GDDAT     ,GET PATTERN
 5019  020654  005337  002174                  DEC     TEMP5           ;DOWN COUNT
 5020  020660  000402                          BR      4$
 5021  020662  005037  002216          3$      CLR     GDDAT           ,ZERO FILL
 5022  020666  023712  002216          4$      CMP     GDDAT,(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$ERCODE
  (5)  020714  000264                           WORD   180
  (5)  020716  003024                           WORD   MDCER
  (5)  020720  004650                           WORD   ERR8
 5030  020722  005337  002166                  DEC     TEMP2           ,ACCOUNT FOR PRINT
 5031
 5032  020726  005337  002164          5$      DEC     TEMP1           ,WORDS READ IN
 5033  020732  001407                          BEQ     CEND
 5034  020734  005722                          TST     (R2)+           NEXT WORD
 5035  020736  005337  002162                  DEC     TEMP0
 5036  020742  001656                          BEQ     96$
```

```
 5038  020744  005337  002170                DEC     TEMP3           ,WORDS TO CHECK
 5039  020750  000716                        BR      1$
 5040
 5041  020752  005737  002160          CEND  TST     DECNT           ,DO WE WANT TO PRINT SUMMARY
 5042  020756  001406                        BEQ     1$              ,NO,EXIT
 5043
```

```
 5045  020760  005464  000042                NEG     BMP(R4)          ,MAKE POSITIVE WORD COUNT
 5046  020764                                ERRHRD  190 ,MDCER,ERR6 ,DATA ERROR SUMMARY
  (3)  020764  104463                        TRAP    T$ERCODE
  (5)  020766  000276                         WORD   190
  (5)  020770  003024                         WORD   MDCER
  (5)  020772  004552                         WORD   ERR6
 5047
 5048  020774  000205              1$        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              WTRDY   MOV     R0,-(SP)         ,SAVE REGISTERS
 5058  021000  010146                      MOV     R1,-(SP)
 5059  021002  012701  001750              MOV     #1000 ,R1        ,WAIT A WHILE
 5060  021006                      1$      WAITUS  #2
  (3)  021006  012700  000002              MOV     #2 ,R0
  (3)  021012  104027                      EMT     C$WTU
 5061  021014  032774  000200  000104      BIT     #CRDY,@DCS(R4)   ,READY SET?
 5062  021022  001006                      BNE     2$               ,YES, EXIT
 5063  021024  005301                      DEC     R1               ,TIMED OUT?
 5064  021026  001367                      BNE     1$               ,NO GO BACK
 5065
 5066  021030                              ERRDF   1002 ,NOCRDY,ERR12
  (3)  021030  104462                      TRAP    T$ERCODE
  (5)  021032  001752                       WORD   1002
  (5)  021034  002450                       WORD   NOCRDY
  (5)  021036  005150                       WORD   ERR12
 5067
 5068  021040  012601              2$        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      CSTUFF
 5082  021062  016403  000104      ISDRST  MOV     DCS(R4),R3
 5083  021066  012763  000013  000004      MOV     #DRST,DA(R3)
 5084  021074  012763  000204  000000  CSTUFF  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,WTRDY
 5088  021122  022763  000013  000004      CMP     #DRST,DA(R3)
 5089  021130  001402                      BEQ     1$
 5090  021132  016301  000006              MOV     MP(R3) R1
```

```
5091  021136  000205                  1$      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                  1$      ASL     R3
5104  021164  006101                          ROL     R1
5105  021166  005202                          INC     R2
5106  021170  001374                          BNE     1$
5107  021172  063703  002126                  ADD     LONUM,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 INITIALLY
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), PATTERN 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 OCCURS WE WILL THEN
5128                                  ;WRITE INDIVIDUAL SECTORS FOR THAT TRACK.  WE DO WRITES
5129                                   READS AND INCORE COMPARISONS TO VERIFY
5130
5131                                   CALL JSR R5 WRPACK
5132
5133
5134  021236  010046                  WRPACK  MOV     R0,-(SP)        ;SAVE REGISTERS
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
  (8) 021252  012746  004171                  MOV     #MSWRPK,-(SP)
  (7) 021256  012746  006676                  MOV     #FMT18,-(SP)
  (6) 021262  012746  000002                  MOV     #2,-(SP)
  (3) 021266  010600                          MOV     SP,R0
  (4) 021270  104017                          EMT     C$PNTF
  (4) 021272  062706  000006                  ADD     #6,SP
5140  021276                                  PRINTF  #FMT1,#MPLCS,DCS,R4,#ERNM,@ERBLK+1,R4
```

```
(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$PNTF
 (4) 021334 062706 000014                   ADD     #14,SP
5141 021340 004537 022374                   JSR     R5,HDHOME       ;HEADS HOME
5142
5143                                        ;
5144                                        ;NOW ACTUALLY WRITE DATA OUT ON PACK. WILL NOT WRITE LAST
5145                                        ;TRACK
5146                                        ;
5147
5148 021344 005037 002164                   CLR     TEMP1           ;TEMP1=HEAD
5149 021350 005001                          CLR     R1              ;R1=CYL
5150 021352 022701 077600          CONWR    CMP     #77600,R1       ;CYL=255?
5151 021356 001014                          BNE     STWRT           ;NO GO WRITE TRACK
5152 021360 005737 002164                   TST     TEMP1           ;YES. CHECK IF HEAD = 1?
5153 021364 001411                          BEQ     STWRT            HEAD = 0 GO WRITE
5154 021366 004537 022374          ENDWR    JSR     R5,HDHOME       ;HEADS HOME
5155 021372 012664 000110                   MOV     (SP)+,BBA(R4)
5156 021376 012603                          MOV     (SP)+,R3
5157 021400 012602                          MOV     (SP)+,R2
5158 021402 012601                          MOV     (SP)+,R1
5159 021404 012600                          MOV     (SP)+,R0
5160 021406 000205                          RTS     R5              ;END EXIT
5161
5162                                        THIS PORTION WILL WRITE THE PACK USING MULTIPLE SECTORS IF A
5163                                        ERROR OCCURS WE WILL GO TO 2$ AND INDIVIDUAL SECTORS
5164
5165 021410 005002                 STWRT    CLR     R2              ;INITIAL SECTOR 0
5166 021412 012764 002252 000110           MOV     #BUF1,BBA(R4)   ;BUFFER START
5167 021420 012764 175400 000042           MOV     #-1280.,BMF(R4) ;10 SECTORS
5168 021426 004537 017154                  JSR     R5,WRBUF        ;WRITE BUFFER INTO MEMORY
5169 021432 010164 000040          201$    MOV     R1,BDA(R4)      ;SET UP SECTOR
5170 021436 053764 002164 000040           BIS     TEMP1,BDA(R4)
5171 021444 050264 000040                  BIS     R2,BDA(R4)
5172 021450 012764 002252 000110           MOV     #BUF1,BBA(R4)   ;SET UP TO WRITE
5173 021456 012764 000012 000044           MOV     #WRITE,FUNC(R4) ;WRITE
5174 021464 004537 014042                  JSR     R5,LDFUNC
5175 021470 004537 020776                  JSR     R5,WTRDY        ;WAIT FOR READY
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$
5180
5181 021510 012764 000002 000044   203$    MOV     #WRCHK,FUNC(R4)
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
```

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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                  JSR     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                  JSR     R5,CKBDSC       ;BAD SECTOR FILE
5217  021664  005737  002154                  TST     HDRFND          ;IF SET, IT WAS
5218  021670  001050                          BNE     95$             ;YES GO TO NEXT SECTOR
5219
5220  021672  005237  002160                  INC     DECNT           ;NO, GIVE IT ONE MORE TRY
5221  021676  023727  002160  000002          CMP     DECNT,#2        ;IT MAY HAVE BEEN NOISE.
5222  021704  001346                          BNE     96$
5223
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  80$     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,CKBDSC       ;A KNOWN BAD SECTOR
5240  021762  005737  002154                  TST     HDRFND          ;IT WAS THEN
5241  021766  001011                          BNE     95$             ;GO TO NEXT SECTOR
5242
```

```
 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  000010                    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  GO 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    T$ERCODE
  (5)  022202  000307                             WORD   139
  (5)  022204  002525                             WORD   NWRTS
  (5)  022206  005156                             WORD   ERR13
 5288  022210  005264  000012                    INC     ERRCNT(R4)
 5289  022214  005737  007532                    TST     T DRP           ,ARE WE COUNTING ERRORS
 5290  022220  001413                            BEQ     2$              ,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,DPDRV
```

```
  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     SYSCLK          ;DO WE HAVE A CLOCK
  5304  022256  001002                          BNE     4$              ;YES, GO SERVICE IT
  5305  022260                                   BREAK                   ;NO, CALL SUPER FOR  C
   (3)  022260  104022                          EMT     C$BRK
  5306  022262  000205                          RTS     R5              ;EXIT
  5307  022264                          4$      REQTIM  R0              ;GET PRESENT TIME
   (3)  022264  104045                          EMT     C$REQTIM
  5308  022266  020037  002224          1$      CMP     R0,LSTTIM       ;HAS IT MOVED
  5309  022272  001437                          BEQ     3$              ;NO MOVEMEMT 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 MINUTES
  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     #MK,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                                    ;          - BDA(R4)      HAS     DISK ADDRESS
5357                                    ;
5358  022472  023737  007524  007526  GWCDA   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          99$     JSR     R5,RAND         ;GET RANDOM # FOR SECTOR
5363  022514  013702  002126                   MOV     LONUM,R2
5364  022520  042702  177700          1$      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          3$      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
```

```
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                        RTS     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    93$     ADD     #128.,R2                ;ONE SECTORS WORTH
 5461  023046  005303                    DEC     R3                      ,DONE
 5462  023050  001374                    BNE     93$                     ,NO
 5463  023052  016403  000042            MOV     BMP(R4),R3              ;GET WORD COUNT
 5464  023056  005403                    NEG     R3                      ;MAKE IT POSITIVE
 5465  023060  020203                    CMP     R2,R3                   ;WORKING WITH FULL SECTOR
 5466  023062  003005                    BGT     94$                     ;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      96$                     ,GO COMPARE BUFFER
 5470  023076  160302            94$     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                    96$     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$PNTB
  (4)  023154  062706  000014            ADD     #14,SP
 5478  023160  012700  024324            MOV     #PATLST,R0              ;CHECK PATTERN LIST
 5479  023164  012701  000010            MOV     #8.,R1
 5480  023170  022062  000002    1$      CMP     (R0)+,2(R2)
 5481  023174  001415                    BEQ     2$
 5482  023176  005301                    DEC     R1
 5483  023200  001373                    BNE     1$
 5484
 5485  023202                    3$      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$PNTB
  (4)  023222  062706  000006            ADD     #6,SP
 5486  023226  000532                    BR      STDMP
 5487
 5488  023230  021227  000200    2$      CMP     (R2),#128.
 5489  023234  101362                    BHI     3$
 5490  023236  005037  002160            CLR     DECNT
 5491  023242  013701  007554            MOV     T.CLT,R1
 5492                                    ;
 5493  023246  012237  002162            MOV     (R2)+,TEMP0             ,NONZERO WORD COUNT
```

```
 5494  023252  013737  002162  002276          MOV     TEMP0,DWCNT
 5495  023260  005437  002276                  NEG     DWCNT
 5496  023264  012237  002164                  MOV     (R2)+,TEMP1
 5497  023270  162737  000002  002162          SUB     #2,TEMP0
 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     TEMP0           ;ZERO OR PATTERN
 5502  023322  001417                          BEQ     6$              ;ZERO BRANCH
 5503  023324  005337  002162                  DEC     TEMP0
 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)+,GDDAT
 5509  023354  005337  002174                  DEC     TEMP5
 5510  023360  000402                          BR      7$
 5511  023362  005037  002216          6$      CLR     GDDAT
 5512  023366  005237  002276          7$      INC     DWCNT
 5513  023372  021237  002216                  CMP     (R2),GDDAT
 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,GDDAT,(R2)
  (10) 023412  011246                          MOV     (R2),-(SP)
  (9)  023414  013746  002216                  MOV     GDDAT,-(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     C$PNTB
  (4)  023440  062706  000012                  ADD     #12,SP
 5521
 5522  023444  005237  002166          8$      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     C$PNTB
  (4)  023506  062706  000010                  ADD     #10,SP
 5527
 5528  023512  000205                          RTS     R5
 5529
 5530  023514  013701  007554          STDMP   MOV     T_CLT,R1
 5531  023520  012703  000012                  MOV     #10.,R3
 5532  023524                          1$      PRINTB  #FMT14A,(R2)
  (8)  023524  011246                          MOV     (R2),-(SP)
  (7)  023526  012746  006502                  MOV     #FMT14A,-(SP)
```

```
   (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 OR
  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)+,R4          ;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 BSECPT(R4)      HDRFND IS SET IF WE FIND IT
  5567
  5568
  5569
  5570  023640  005037  002154          CHKBDSC CLR     HDRFND            ;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     BSECPT(R4),R2     ;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
```

```
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
5593
5594
5595                              ,BUFFER TO STORE BAD SECTOR LISTS
5596
5597  023724  000020              BSEC0   .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
5605
5606                               LIST OF PATTERNS USED IN WPITING
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
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 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
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 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            PAT5    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            PAT6    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            PAT7    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
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 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                      RXFR1                   ;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 SEEK
  (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 NECESARY
  (1)  025052  000100                      SERNM1                  ;SERIAL NUMBER OF CARTRIDGE
  (1)  025054  000102                      SERNM2                   SERIAL NUMBER OF CARTRIDGE
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(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                    HCRCER          ,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 FUNCTION LOADED
(1)  025142  000046                    BCSADR          ,CSR IMAGE OF LAST COMMAND
(1)  025144  000050                    LSTHDR          ,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                    DOWCK           ,WRITE CHECK NECESARY
(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
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(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                    HCRCER    ,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                    DOWCK     ,WRITE CHECK NECESARY
(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                    DRSEL     ,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                    RSEEK
(1)  025334  000116                    SOFTCS    ,CSR AT TIME OF SOFT ERROR
(1)  025336  000120                    PRPOS     ,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                    RXFR2     ,  "     "     "     "   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                    HCRCER    ,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
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(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 NECESARY
(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                BSECPT    ,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)
(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                ERRCNT    ,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                HCRCER    ,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                TRERR     ,TRACKING ERROR COUNT
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(1)  025556  000074                    DATCER
(1)  025560  000076                    DOWCK     ,WRITE CHECK NECESARY
(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    ;POINTER 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                    RXFR1     ,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 NECESARY
(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                HCRCER      ,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                NXMCNT      ,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 NECESARY
(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                HCRCER      ,HEADER CRC ERROR COUNT
(1)  026076  000026                DLTCNT      ,DATA LATE ERROR COUNT
(1)  026100  000030                OPICNT      ,OPERATION INCOMPLETE ERROR COUNT
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   (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 NECESARY
   (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-L$HARD/2
5820
5321  026176                                 GPRML   CNTYPE,CNT,1,YES
   (4)  026176  004130                        WORD   T$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$HILIM
5823  026214                                 GPRMA   VECMSG,VECT,0,0.776,YES
   (4)  026214  001031                        WORD   T$CODE
   (4)  026216  026302                        WORD   VECMSG
   (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$CODE
   (4)  026226  026271                        WORD   BRMSG
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   (4)  026230  000340                          .WORD   340
   (4)  026232  000000                           WORD   T$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$SOFT/2
  5850
  5851  026322                                 GPRMD   RTMSG,RLT,D,177777,0,177777,YES
   (4)  026322  000052                           WORD   T$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,SRLT,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$
   (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                        5$       GPRMD   INMSG,TYT,D,177777,1,177777,YES
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                (4)  026370  005052                    WORD   T$CODE
                (4)  026372  027275                    WORD   INMSG
                (4)  026374  177777                    WORD   177777
                (4)  026376  000001                    WORD   T$LOLIM
                (4)  026400  177777                    WORD   T$HILIM
              5857   026402                            GPRML  DRPMS,DRFLG,1,YES
                (4)  026402  021130                    WORD   T$CODE
                (4)  026404  027553                    WORD   DRPMS
                (4)  026406  000001                    WORD   1
              5858   026410                            XFERF  3$
                (5)  026410  032044                    WORD   T$CODE
              5859   026412                            GPRMD  ERMSG,ELT,D,177777,0,177777,YES
                (4)  026412  001052                    WORD   T$CODE
                (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   T$CODE
                (4)  026426  027115                    WORD   SFTMSG
                (4)  026430  177777                    WORD   177777
                (4)  026432  000000                    WORD   T$LOLIM
                (4)  026434  177777                    WORD   T$HILIM
              5861   026436                            GPRMD  DERPMS,DCD,D,177777,0,177777,YES
                (4)  026436  036052                    WORD   T$CODE
                (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   T$CODE
                (4)  026452  027177                    WORD   SEMSG
                (4)  026454  177777                    WORD   177777
                (4)  026456  000000                    WORD   T$LOLIM
                (4)  026460  177777                    WORD   T$HILIM
              5863   026462                            GPRMD  DREMSG,DET,D,177777,0,177777,YES
                (4)  026462  025052                    WORD   T$CODE
                (4)  026464  027212                    WORD   DREMSG
                (4)  026466  177777                    WORD   177777
                (4)  026470  000000                    WORD   T$LOLIM
                (4)  026472  177777                    WORD   T$HILIM
              5864   026474                    3$      GPRML  STLMT,OPFLG,1,YES
                (4)  026474  024130                    WORD   T$CODE
                (4)  026476  027516                    WORD   STLMT
                (4)  026500  000001                    WORD   1
              5865   026502                            XFERF  2$
                (5)  026502  013044                    WORD   T$CODE
              5866   026504                            GPRMD  DAMSG,DAT,D,177777,1,177776,YES
                (4)  026504  003052                    WORD   T$CODE
                (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   T$CODE
                (4)  026520  027255                    WORD   SKMSG
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   (4)  026522  177777                        WORD   177777
   (4)  026524  000001                        WORD   T$LOLIM
   (4)  026526  177776                        WORD   T$HILIM
 5868   026530                        2$      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$HILIM
 5874   026574                        8$      GPRML  RDONLY,ROF,1,YES
   (4)  026574  026130                        WORD   T$CODE
   (4)  026576  027047                        WORD   RDONLY
   (4)  026600  000001                        WORD   1
 5875   026602                                GPRML  RANPAT,RAN,1,YES
   (4)  026602  027130                        WORD   T$CODE
   (4)  026604  027057                        WORD   RANPAT
   (4)  026606  000001                        WORD   1
 5876   026610                                XFERT  4$
   (5)  026610  006024                        WORD   T$CODE
 5877   026612                                GPRMD  ONLONE,PAT,0,17 ,7,YES
   (4)  026612  030032                        WORD   T$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                        4$      GPRML  WCKMSG WCK,1,YES
   (4)  026624  035130                        WORD   T$CODE
   (4)  026626  027607                        WORD   WCKMSG
   (4)  026630  000001                        WORD   1
 5879   026632                        7$      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
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