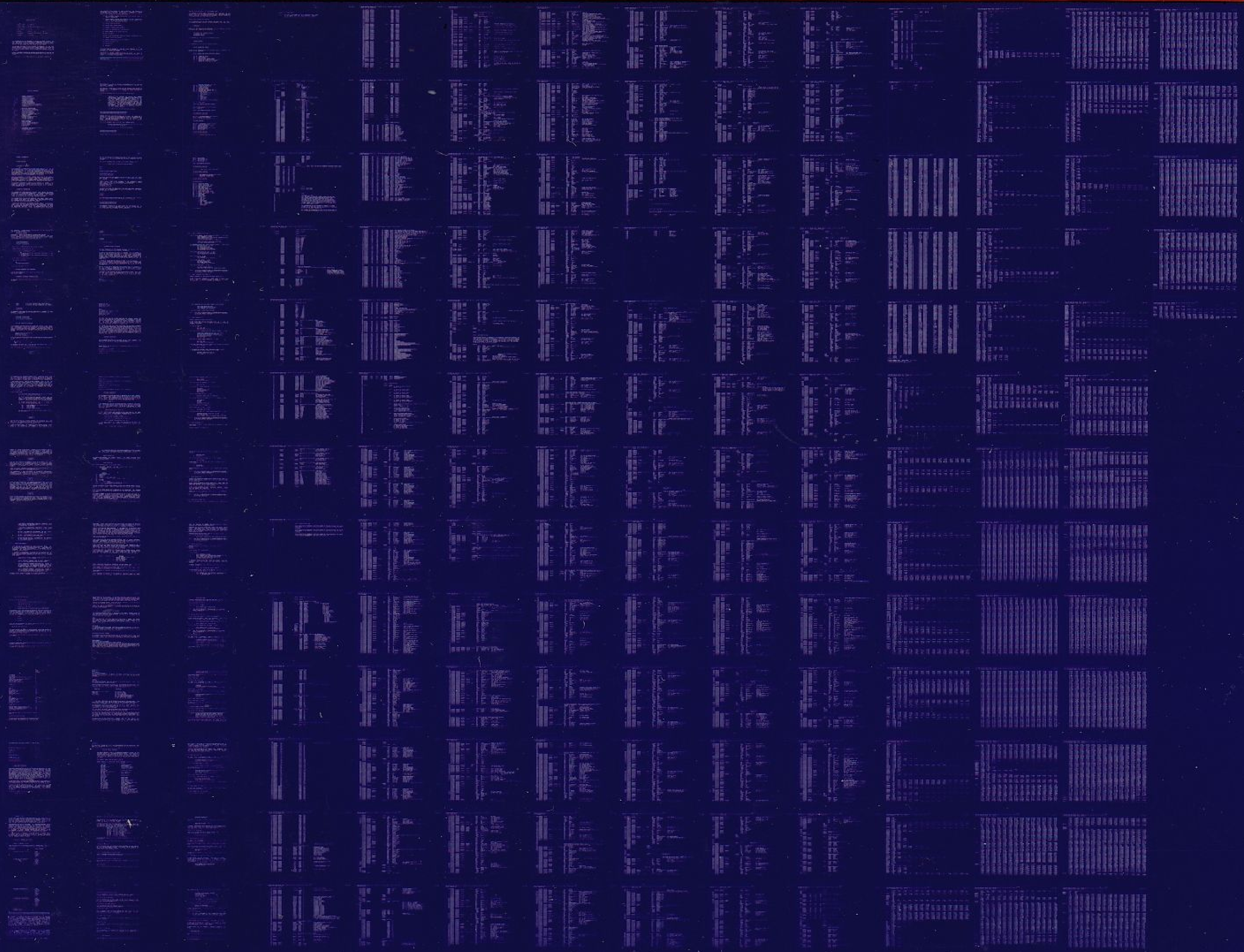
RL11,RLV11,
RL01,RL02

DRIVE TEST 1
CZRLIDO

AH-F118D-MC
FICHE 1 OF 1

JAN 1983



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IDENTIFICATION

PRODUCT CODE: AC-F119D-MC

PRODUCT NAME: CZRLIDO RL01/02 DRIVE TEST 1

DATE CREATED: 5-JAN-79

REVISED: 6-NOV-81

MAINTAINER: DIAGNOSTIC ENGINEERING - COLORADO

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

1.1.1 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC 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 2.2 ''CHAIN MODE OPERATION'' FOR DETAILS OF CHAINING PROCEDURE). IT IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, WHICH AT RUN TIME IS APPENDED TO A COMMON FRONT-END PIECE OF SUPERVISOR SOFTWARE THROUGH WHICH THE DIAGNOSTIC PROGRAM INTERFACES TO THE ENVIRONMENT AS IT EXECUTES.

WHEN THIS DIAGNOSTIC IS STARTED, 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 (DR>). AT COMMAND MODE THE OPERATOR MAY ENTER ANY OF SEVERAL COMMANDS AS DESCRIBED IN 2.0 ''OPERATING INSTRUCTIONS''.

THE DIAGNOSTIC PROGRAM IS LOADED IN THE LOWER 8K OF MEMORY. THE DIAGNOSTIC SUPERVISOR CODING OCCUPIES 6.25K OF THE UPPER PART OF MEMORY JUST BELOW THE XXDP+ MONITOR WHICH RESIDES IN THE UPPERMOST 1.5K OF MEMORY SPACE.

1.1.2 DIAGNOSTIC INFORMATION

THIS PROGRAM TESTS AND EXERCISES RL01/02 DISK DRIVES RL11/RLV11 CONTROLLERS (4 DRIVES PER CONTROLLER). THE ENTIRE PROGRAM IS RUN ON THE FIRST DRIVE BEFORE STARTING ON THE SECOND. THE PROGRAM STARTS BY TESTING THE SIMPLEST FUNCTIONS FIRST USING THE LOGIC TESTED IN EARLIER TESTS TO TEST MORE COMPLEX FUNCTIONS.

THIS PROGRAM TESTS THE RL01/02 INTERFACE AND BASIC DRIVE LOGIC. GET STATUS WITH RESET, GET STATUS, SEEK, AND READ HEADER ARE THE ONLY COMMANDS EXECUTED IN THE PROGRAM. ONLY SEEKS WITH 0 DIFFERENCE ARE USED SO NO HEAD MOVEMENT IS REQUIRED.

A SIGNIFICANT PORTION OF THE PROGRAM REQUIRES MANUAL INTERVENTION. THESE TESTS TEST THE COVER OPEN AND WRITE LOCK STATUS. THE DRIVE MUST BE LOADED AND UNLOADED TO TEST ALL THE CONDITIONS OF HEADS OUT, BRUSH HOME, AND DRIVE STATES. THE PROGRAM CAN BE RUN IN AUTOMATIC MODE IN WHICH CASE ALL TESTS REQUIRING MANUAL INTERVENTION

ARE BYPASSED. WITHOUT MANUAL INTERVENTION, THE TEST REQUIRES APPROXIMATELY 135 SECONDS TO RUN.

1.1.3 DIAGNOSTIC HISTORY

REVISION C: MODIFY THE DIAGNOSTIC TO RUN USING THE DRS.
REVISION D: THE RL DRIVES HAD THE BRUSH DRIVE REMOVED. THE DIANOSTIC CORRECTLY TESTS BOTH DRIVES WITH AND WITHOUT A BRUSH DRIVE. IT ALSO WILL WORK ON A SYSTEM THAT DOES NOT HAVE A KW11P. BREAKS WERE INSERTED TO FACILITATE QUICKER RESPONSE TO A C.

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

* PDP-11/LSI-11 PROCESSOR WITH 16K OR MORE OF MEMORY

* CONSOLE DEVICE (LA30,LA36,VT50,ETC.)

* 1 OR 2 RL11/RLV11 CONTROLLER(S) WITH:

  1 - 8 RL01 DRIVES WITH RL01K CARTRIDGES CONTAINING A 'BAD SECTOR FILE'
  1 - 8 RL02 DRIVES WITH RL02K CARTRIDGES CONTAINING A 'BAD SECTOR FILE'

* KW11P CLOCK (P CLOCK) OR KW11L (L CLOCK)

* LINE PRINTER (OPTIONAL)

1.2.2 SOFTWARE REQUIREMENTS

CZRLIDO RL01/02 DRIVE TEST 1

1.3 RELATED DOCUMENTS AND STANDARDS

RL01/02 DISK SUBSYSTEM USER'S GUIDE (EK-RL012-UG-002)
XXDP+/USER'S MANUAL

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

THE RL01/02 SUBSYSTEM SHOULD HAVE SUCCESSFULLY RUN THE FOLLOWING PROGRAMS:

CVRLA	RLV11 RL01 DISKLESS TEST (RLV11 ONLY)
CZRLG	RL11/RLV11 RL01/02 CONTROLLER TEST (PART 1)
CZRLH	RL11/RLV11 RL01/02 CONTROLLER TEST (PART 2)

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE RL01/02 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 HOW TO RUN THIS DIAGNOSTIC

2.1.1 THE FIVE STEPS OF EXECUTION

THIS DIAGNOSTIC PROGRAM SHOULD BE LOADED AND STARTED USING NORMAL XXDP+ PROCEDURES. START THE EXECUTION OF THE XXDP+ MONITOR BY USING THE APPROPRIATE BOOTSTRAP PROGRAM. THE MONITOR WILL PRINT A MESSAGE IDENTIFYING ITSELF AND REQUESTING THAT THE CURRENT DATE BE ENTERED. AN EXAMPLE OF THIS MESSAGE IS GIVEN BELOW FOR THE XXDP+ MONITOR:

```
CHMDKA0 XXDP+ DK MONITOR NNK
BOOTED VIA UNIT 0
ENTER DATE (DD-MMM-YY):
```

AFTER THE DATE HAS BEEN ACCEPTED BY THE MONITOR THE RESTART ADDRESS OF THE MONITOR IS PRINTED. THEN THE FOLLOWING TWO QUESTIONS ARE ASKED:

```
50 HZ ? N
LSI ?   N
```

THE DEFAULTS ARE BOTH "NO". TYPE "R" AND THE PROGRAM NAME TO RUN THE PROGRAM. DO NOT TYPE THE EXTENSION.

WHEN THIS DIAGNOSTIC IS STARTED THE FOLLOWING STEPS WILL OCCUR:

```
***********
* STEP 1 *
***********
```

THE DIAGNOSTIC WILL ISSUE THE PROMPT "DR>". FROM THIS POINT UNTIL THE TIME WHEN YOU RESTART XXDP+, YOU WILL BE TALKING TO THE DIAGNOSTIC, NOT XXDP+. WE WILL REFER TO THE PRESENCE OF THIS PROMPT AS BEING IN DIAGNOSTIC COMMAND MODE, AS OPPOSED TO XXDP+ COMMAND MODE.

AT THIS POINT YOU WILL ENTER A "START" COMMAND. THIS IS NOT THE SAME AS THE XXDP+ "START" COMMAND, WHICH YOU ALREADY ISSUED IN RESPONSE TO THE XXDP+ DOT PROMPT. THIS "START" COMMAND CAN TAKE A NUMBER OF SWITCHES AND FLAGS (ALL OPTIONAL) AND THE DETAILS OF THESE ARE SET FORTH IN "2.3 DETAILS OF COMMANDS AND SYNTAX". HOWEVER, IN ORDER TO USE THE PROGRAM, ALL YOU NEED TO SAY IS SOMETHING LIKE THIS:

```
        STA/PASS:1/FLAGS:HOE
```

THINGS TO NOTE HERE:

1. ONLY THE FIRST THREE CHARACTERS OF THIS OR ANY COMMAND AT THE "DR>" LEVEL NEED TO BE TYPED.

2. THE "PASS" SWITCH SPECIFIES HOW MANY PASSES YOU DESIRE. A PASS CONSISTS OF RUNNING THE FULL DIAGNOSTIC AGAINST ALL UNITS BEING TESTED (THIS WILL BE EXPLAINED SHORTLY). ONE PASS IS SPECIFIED IN THE ABOVE EXAMPLE.

3. THE "FLAGS" SWITCH MAY SPECIFY ANY OF A NUMBER OF FLAGS, BUT THE MAIN USEFUL ONES ARE:

PNT	PRINT NUMBER OF TEST BEING EXECUTED
LOE	LOOP ON ERROR
HOE	HALT ON ERROR
IER	INHIBIT ERROR PRINTOUT

   THE HOE FLAG IS SPECIFIED IN THE ABOVE EXAMPLE (WE'LL SEE WHY SHORTLY).

```
**********
* STEP 2 *
**********
```

WHEN YOU HAVE TYPED IN A "START" COMMAND, THE DIAGNOSTIC WILL COME BACK WITH THE QUESTION "# UNITS?" TO WHICH YOU SHOULD RESPOND BY TYPING IN THE NUMBER OF DEVICES YOU WISH TO TEST.

A WORD OF WARNING HERE: THE NUMBER OF UNITS DEPENDS ON THE TARGET DEVICE OF THE DIAGNOSTIC. FOR EXAMPLE, IF THE DIAGNOSTIC IS DIRECTED AT A DISK DRIVE, THEN THE NUMBER OF UNITS WOULD BE THE

NUMBER OF DRIVES TO BE TESTED. WHEREAS IF THE DIAGNOSTIC WAS DIRECTED AT THE DISK CONTROLLER, THEN THE NUMBER OF UNITS WOULD BE THE NUMBER OF CONTROLLERS. THE TARGET DEVICE OF A DIAGNOSTIC CAN ALWAYS BE DETERMINED BY INSPECTING THE ''HEADER'' STATEMENT NEAR THE BEGINNING OF THE SOURCE CODE. ONE OF THE OPERANDS OF THIS ''HEADER'' STATEMENT SHOULD BE THE DEVICE TYPE OF THE DIAGNOSTIC.

```
***********
* STEP 3 *
***********
```

WHEN YOU HAVE TYPED IN THE NUMBER OF UNITS TO BE TESTED, THE DIAGNOSTIC WILL ASK YOU THE ''HARDWARE QUESTIONS''. THE ANSWERS TO THESE QUESTIONS ARE USED TO BUILD TABLES IN CORE, CALLED ''HARDWARE P-TABLES''. ONE HARDWARE P-TABLE WILL BE BUILT FOR EACH UNIT TO BE TESTED.

THERE ARE SEVERAL HARDWARE QUESTIONS AND THE ENTIRE SERIES WILL BE POSED N TIMES, WHERE N IS THE NUMBER OF UNITS.

THIS REPRESENTS A NEW PHILOSOPHY IN DIAGNOSTIC ENGINEERING. DIAGNOSTICS IN THE FUTURE WILL NOT BE WRITTEN TO AUTOSIZE OR ASSUME STANDARD ADDRESSES: INSTEAD, THEY WILL ASK THE OPERATOR FOR ALL THE INFORMATION THEY NEED TO TEST THE DEVICE.

```
***********
* STEP 4 *
***********
```

AFTER YOU HAVE ANSWERED ALL THE HARDWARE QUESTIONS (SEC 2.5) FOR ALL THE UNITS, YOU WILL BE ASKED ''CHANGE SW?'' IF YOU WANT TO BE ASKED THE SOFTWARE QUESTIONS THAT DETERMINE THE BEHAVIOR OF THIS PROGRAM, TYPE ''Y''. IF YOU WANT TO TAKE ALL THE DEFAULTS TO THESE QUESTIONS, TYPE ''N''. IF YOU TYPE ''Y'' YOU WILL BE ASKED THE SOFTWARE QUESTIONS (SEC 2.6), AND THE ANSWERS WILL BE PUT INTO THE SOFTWARE P-TABLE IN THE PROGRAM. THE SERIES OF QUESTIONS WILL BE ASKED JUST ONCE, REGARDLESS OF THE NUMBER OF UNITS TO BE TESTED.

```
***********
* STEP 5 *
***********
```

AFTER YOU HAVE ANSWERED THE SOFTWARE QUESTIONS, THE DIAGNOSTIC WILL BEGIN TO EXECUTE THE HARDWARE TEST CODE. THERE ARE SEVERAL THINGS THAT CAN HAPPEN NEXT, DEPENDING ON WHETHER A HARDWARE ERROR IS ENCOUNTERED AND ALSO ON WHAT SWITCH VALUES YOU SELECTED ON THE START COMMAND. CONSIDER THE POSSIBILITIES:

1. IF NO ERROR IS ENCOUNTERED, THEN THE DIAGNOSTIC WILL SIMPLY EXECUTE THE DESIRED NUMBER OF PASSES AND RETURN TO COMMAND MODE (PROMPT DR>).

2. IF AN ERROR IS ENCOUNTERED, THEN ONE OF THREE THINGS HAPPENS, DEPENDING ON THE SETTINGS OF THE HOE AND LOE FLAGS.

   HOE SET: THE ERROR WILL BE REPORTED ON THE CONSOLE AND THE DIAGNOSTIC WILL RETURN TO COMMAND MODE.

   LOE SET: THE DIAGNOSTIC WILL LOOP ENDLESSLY ON THE BLOCK OF CODE THAT DETECTED THE ERROR.

   NEITHER HOE NOR LOE SET: THE ERROR WILL BE REPORTED ON THE CONSOLE AND NORMAL EXECUTION WILL RESUME AS IF NO ERROR HAD OCCURRED.

2.1.2 SAMPLE RUN-THROUGH

LET'S SEE HOW ALL THIS WORKS IN A REAL SITUATION. RECALL THAT WE ENTERED THE COMMAND "STA/PASS:1/FLAGS:HOE". THIS WOULD BE A VERY TYPICAL WAY TO RUN THE DIAGNOSTIC. IF NO ERRORS ARE ENCOUNTERED, THE SINGLE REQUESTED PASS WILL BE EXECUTED AND THE PROMPT WILL BE RE-ISSUED.

IF AN ERROR IS ENCOUNTERED, THE ERROR WILL BE REPORTED AND THE PROMPT WILL BE REISSUED (BECAUSE THE HOE FLAG IS SET). AT THIS POINT THERE ARE FOUR DIFFERENT WAYS YOU CAN GET THE PROGRAM GOING AGAIN:

1. ISSUE ANOTHER "START" COMMAND (THUS GOING THRU ALL OF STEPS 1, 2, 3, 4, AND 5 AGAIN).

2. ISSUE A "RESTART" COMMAND (SAME AS START COMMAND EXCEPT THAT THE HARDWARE QUESTIONS ARE NOT ASKED).

3. ISSUE A "CONTINUE" COMMAND (EXECUTION WILL RESUME AT THE BEGINNING OF THE PARTICULAR HARDWARE TEST (MOST DIAGNOSTICS CONSIST OF A NUMBER OF THESE) THAT IT WAS IN WHEN THE ERROR HALT OCCURED. NO QUESTIONS ASKED.

4. ISSUE A "PROCEED" COMMAND: EXECUTION WILL RESUME AT THE INSTRUCTION FOLLOWING THE ERROR REPORT (THIS IS A SPECIAL COMMAND AND CAN BE ISSUED ONLY AT A HALT

THE MOST TYPICAL THING TO DO HERE IS TO ISSUE THE PROCEED, BUT WITH DIFFERENT FLAG SETTINGS. PROBABLY YOU WOULD WANT TO SAY:

```
        PRO/FLAGS:IER:LOE:HOE=0
```

THIS WILL DO THE FOLLOWING:

1. TURN ON THE IER (INHIBIT ERROR PRINTOUT) FLAG
2. TURN ON THE LOE FLAG
3. TURN OFF THE HOE FLAG
4. RESUME EXECUTION AT INSTRUCTION AFTER ERROR REPORT

THE DIAGNOSTIC WILL NOW LOOP ON THE BLOCK OF CODE THAT DETECTED AND REPORTED THE ERROR, BUT NO ERROR PRINTOUT WILL OCCUR. THUS YOU CAN STUDY THE ERROR OR SCOPE IT OR WHATEVER. WHEN YOU'VE SEEN ENOUGH, YOU MAY HIT CONTROL/C. THIS WILL TAKE YOU OUT OF THE LOOP AND PUT YOU BACK INTO COMMAND MODE. YOU NOW HAVE THREE CHOICES:

1. START
2. RESTART
3. CONTINUE

LET'S SAY YOU'VE REPAIRED THE DEFECT FOUND ABOVE AND WANT TO FINISH RUNNING THE DIAGNOSTIC. YOU WOULD TYPE

```
    CON/FLAGS:HOE:IER=0:LOE=0
```

THIS WILL RESTORE THE FLAGS TO THEIR ORIGINAL VALUES AND RESUME EXECUTION AT THE BEGINNING OF THE HARDWARE TEST YOU WERE IN. IF THE ERROR DOES NOT RECUR, THE EXECUTION WILL FLOW RIGHT ON THRU TO THE NEXT ERROR OR TO END OF PASS.

IF AT END OF PASS YOU WANT TO RUN THE DIAGNOSTIC AGAIN, YOU HAVE TWO CHOICES:

1. START
2. RESTART

YOU WOULD CHOOSE ONE, DEPENDING ON WHETHER YOU WANTED TO ANSWER THE HARDWARE QUESTIONS AGAIN.

THE FULL PRINT-OUT FROM THE ABOVE DIALOGUE MIGHT LOOK LIKE THIS (O=OPERATOR, D=DIAGNOSTIC):

```
                                          BY
                                          WHOM
                                          ENTERED:
                                          -------

.R CZRLID                                 O
DRS LOADED                                D
DIAG. RUN-TIME SERVICES REV. D APR-79     D
CZRLI-D-0                                 D
CZRLI TESTS THE RL01-02 INTERFACE         D
AND BASIC DRIVE LOGIC
UNIT IS RL01, RL02                        D
DR>STA/PASS:1/FLAGS:HOE                   D,O

CHANGE HW (L) ? Y                         D,O

# UNITS (D) ? 2                           D,O

UNIT 0                                    D
RL11 (L) Y ?                              D,O
BUS ADDRESS (O) 174400 ?                  D,O
VECTOR (O) 160 ?                          D,O
DRIVE (O) 0 ?                             D,O
DRIVE TYPE = RL01 (L) Y ?                 D,O
BR LEVEL (O) 5 ?                          D,O

UNIT 1                                    D
RL11 (L) Y ?                              D,O
BUS ADDRESS (O) 174400 ?                  D,O
VECTOR (O) 160 ?                          D,O
DRIVE (O) 0 ? 1                           D,O
DRIVE TYPE = RL01 (L) ? N                 D,O (N=RL02)
BR LEVEL (O) 5 ?                          D,O

CHANGE SW (L) ? N                         D,O

EXECUTE DRIVE SELECT TESTS (L) N ?        D,O
EXECUTE HEAD ALIGNMENT SUPPORT (L) N ?    D,O
DO MANUAL INTERVENTION TESTS (L) N ? Y    D,O
INPUT ERROR LIMIT (D) 20 ?                D,O


CZRLI HRD ERR 00004 TST 003 SUB 002 PC:004130
ERR HLT

DR>PRO/FLAGS:IER:LOE:HOE=0                D,O

*****************************************************
AT THIS POINT THE DIAGNOSTIC IS LOOPING ON THE
ERROR WITHOUT PRINTING ANYTHING.  YOU CAN SCOPE
```

```
THE ERROR UNTIL YOU HAVE LOCATED IT, THEN ^C OUT
*************************************************

^C                                               0

DR>CON/FLAGS:HOE:IER:LOE=0                       D,0

CHANGE SW (L) ? N                                D,0

CZRLI EOP 1                                      D
^C

DR>RESTART/PASS:1                                D,0

CHANGE SW (L) ? N                                D,0
-------------------
-------------------
-------------------
-------------------
```

2.2 CHAIN MODE OPERATION

CHAIN MODE OPERATION CONSISTS OF THE SEQUENTIAL EXECUTION OF PROGRAMS WITHOUT OPERATOR INTERVENTION. ONLY PROGRAMS THAT HAVE BEEN MODIFIED TO RUN IN CHAIN MODE CAN BE CHAINED. CHAINABLE PROGRAMS ARE IDENTIFIED IN THE DIRECTORY BY A BIC EXTENSION. THE BIC FILES ARE CREATED BY USING THE SETUP UTILITY PROGRAM WHICH IS USED TO PARAMETERIZE THE DIAGNOSTIC PRIOR TO ITS EXECUTION. SETUP PROMPTS THE OPERATOR WITH THE HARDWARE AND SOFTWARE QUESTIONS. THE RESPONSE TO THESE QUESTIONS ARE USED TO BUILD P-TABLES. THE RESULT OF THE SETUP PROCESS IS A FILE WHICH INCLUDES THE DIAGNOSTIC WITH APPENDED P-TABLES. REFER TO THE XXDP+/SUPERVISOR USER'S MANUAL FOR A COMPLETE DESCRIPTION OF THE SETUP UTILITY.

TO RUN CHAIN MODE, THE XXDP+ MONITOR USES AN ASCII FILE (KNOWN AS A CHAIN FILE) LISTING THE PROGRAMS TO BE RUN AND THE NUMBER OF PASSES EACH PROGRAM SHOULD RUN. THIS FILE MUST BE ON THE SYSTEM DEVICE.

A CHAIN FILE MAY BE GENERATED BY USE OF THE XTECO TEXT EDITOR. THIS FILE MUST HAVE A CCC EXTENSION. THE CHAIN FILE MAY CONTAIN ANY OF THE JMMANDS SUPPORTED BY THE XXDP+ MONITOR. THE COMMANDS IN THE ASCII FILE ARE EXECUTED IN THE ORDER IN WHICH THEY ARE ENCOUNTERED.

TO EXECUTE A CHAIN FILE THE USER TYPES:

```
        C FILNAM <CR> OR
```

```
C FILNAM/QV  <CR>
```

IN THE FIRST CASE THE PASS COUNT SPECIFIED IN THE CHAIN FILE IS USED BY THE XXDP+ MONITOR TO DETERMINE THE NUMBER OF PASSES TO EXECUTE EACH PROGRAM. IN THE SECOND CASE THE PROGRAM COUNT IS NOT USED AND EACH PROGRAM IS EXECUTED ONLY ONCE. THE /QV SWITCH PROVIDES A SINGLE EXECUTION MODE OF OPERATION OF QUICK VERIFY.

WHEN PROGRAMS ARE RUN IN CHAIN MODE, THE HARDWARE/SOFTWARE SWITCH REGISTERS SHOULD BE SET TO 000000. THE XXDP+ MONITOR PRINTS EACH COMMAND TAKEN FROM THE CHAIN FILE AND THEN EXECUTES THE COMMAND. WHEN THE LAST COMMAND OTHER THAN ANOTHER C COMMAND HAS BEEN EXECUTED THE XXDP+ MONITOR TERMINATES CHAIN MODE AND TYPES A PROMPT (.). IT IS READY TO ACCEPT ANOTHER COMMAND FROM THE CONSOLE. IF THE LAST COMMAND IS ANOTHER C COMMAND, THE CHAIN MODE WILL CONTINUE AND THE CHAIN FILE SPECIFIED BY THIS NEW C COMMAND WILL BE USED.

IF THE USER WISHES TO TERMINATE CHAIN MODE BEFORE ITS NORMAL TERMINATION HE MAY DO SO BY TYPING A CONTROL/C. HOWEVER, THE MONITOR WILL NOT ABORT THE CHAIN MODE UNTIL IT RECEIVES PROGRAM CONTROL FROM THE PROGRAM CURRENTLY RUNNING.

2.3 DETAILS OF COMMANDS AND SYNTAX

2.3.1 TABLE OF COMMAND VALIDITY

THERE ARE FOUR WAYS OF ENTERING DIAGNOSTIC COMMAND MODE, AND DIFFERENT SUBSETS OF THE DIAG COMMAND SET ARE AVAILABLE WITH EACH:

HOW ENTERED		LEGAL COMMANDS
1.	OPERATOR ENTERED 'RUN DIAG'	START PRINT DISPLAY FLAGS ZFLAGS EXIT
2.	DIAGNOSTIC HAS FINISHED ALL ITS REQUESTED PASSES	START RESTART PRINT DISPLAY FLAGS ZFLAGS EXIT

3.	OPERATOR INTERRUPTED THE DIAGNOSTIC WITH CTRL/C	START RESTART CONTINUE PRINT DISPLAY FLAGS ZFLAGS EXIT
4.	AN ERROR WAS ENCOUNTERED WITH THE HOE FLAG SET SET	START RESTART CONTINUE PROCEED PRINT DISPLAY FLAGS ZFLAGS EXIT

2.3.2 COMMAND SYNTAX

```
***********************************************************************
STA(RT)/TESTS:TEST-LIST/PASS:PASS-CNT/FLAGS:FLAG-LIST/EOP:EOP-INCR
***********************************************************************
```

THE DIAGNOSTIC IN CORE IS EXECUTED IN ACCORDANCE WITH THE SWITCHES SPECIFIED. THE MESSAGE "# UNITS?" IS PRINTED. THE START COMMAND MAY BE ISSUED WHEN DIAGNOSTIC COMMAND MODE HAS BEEN ENTERED VIA ONE OF THE FOLLOWING: A) OPERATOR TYPED "RUN DIAGNOSTIC" B) DIAGNOSTIC FINISHED EXECUTING C) ERROR WAS ENCOUNTERED WITH HOE FLAG SET D) OPERATOR ENTERED CONTROL/C. AFTER THE OPERATOR RESPONDS TO "# UNITS?", THE HARDWARE DIALOGUE IS INITIATED. WHEN IT IS COMPLETED, THE QUESTIONS "CHANGE SW?" IS ISSUED, AND THE ANSWERS, IF GIVEN, BECOME THE NEW DEFAULTS. THEREFORE IT IS NECESSARY TO RELOAD THE PROGRAM IN ORDER TO RETURN TO THE LOAD DEFAULTS.

THE SWITCH ARGUMENTS ARE AS FOLLOWS:

"TEST-LIST" IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) THAT SPECIFY THE TESTS TO BE EXECUTED. THE NUMBERS ARE SEPARATED BY COLONS. THE 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 THE ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS.

"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 TEST EXECUTION. ''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

IDU INHIBIT DROPPING OF UNITS BY DIAGNOSTIC

ADR EXECUTE AUTODROP CODE

LOT LOOP ON TEST

EVL EVALUATE

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.

''EOP-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.

```
********************************************************************
RES(TART)/TEST:TEST-LIST/PASS:PASS-CNT/FLAGS:FLAG-LIST/EOP:EOP-INCR/
UNITS:UNIT-LIST
********************************************************************
```

THE DIAGNOSTIC IN CORE IS EXECUTED IN ACCORDANCE WITH THE SWITCHES SPECIFIED. HOWEVER, NEW "P-TABLES" ARE NOT BUILT. INSTEAD, THE ONES IN CORE ARE USED.

THE QUESTION "CHANGE SW?" IS ASKED AND THE ANSWERS GIVEN BECOME THE NEW DEFAULTS. THE COMMAND MAY BE ISSUED WHEN COMAND MODE HAS BEEN ENTERED VIA A) DIAGNOSTIC IS FINISHED B) HALT ON ERROR C) CONTROL/C.

THE SWITCH ARGUMENTS ARE AS IN THE START COMMAND EXCEPT:

1. "UNIT-LIST" IS A SEQUENCE OF LOGICAL UNIT NUMBERS RANGING FROM 1 THRU N (N = NUMBER OF UNITS BEING TESTED) SPECIFYING WHICH UNITS ARE TO BE TESTED. THE LOGICAL UNIT NUMBER DESIGNATES THE POSITION OF THE P-TABLE IN CORE, ACCORDING TO THE ORDER IN WHICH THEY WERE BUILT. THE UNITS SPECIFIED MUST NOT HAVE BEEN DROPPED BY THE OPERATOR DROP COMMAND. THE UNIT-LIST DEFAULTS TO "ALL THAT HAVE NOT BEEN DROPPED BY OPERATOR COMMAND". THE EFFECT OF THE UNIT-LIST LASTS UNTIL THE NEXT START (WHERE IT IS AUTOMATICALLY RESET TO "ALL") OR THE NEXT RESTART.

2. ALL UNSPECIFIED FLAG SETTINGS ARE UNCHANGED.

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

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 RE-EXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

THE SWITCH ARGUMENTS ARE AS IN THE START COMMAND EXCEPT:

1. DEFAULT FOR PASS-CNT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART

2. UNSPECIFIED FLAG SETTINGS ARE UNCHANGED

```
***************************
PRO(CEED)/FLAGS:<FLAG-LIST>
***************************
```

COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EF-

FECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

THE SWITCH ARGUMENTS ARE THE SAME AS THE START COMMAND EXCEPT:

1. UNSPECIFIED FLAG SETTINGS ARE UNCHANGED

```
****
EXIT
****
```

RETURN TO XXDP+ PROMPT MODE.

```
************************
DRO(P)/UNITS:UNIT-LIST
************************
```

THE UNITS SPECIFIED ARE DROPPED FROM TESTING UNTIL THEY ARE ADDED BACK OR UNTIL A START COMMAND IS GIVEN. A DROP CANNOT BE FOLLOWED BY A PROCEED.

THERE IS ALSO A "DROP" MACRO INTERNAL TO THE DIAGNOSTIC, WHICH GIVES THE FACILITY OF AUTO-DROPPING. THE DURATION OF A PROGRAM DROP, HOWEVER, IS ONLY UNTIL THE NEXT START OR RESTART.

```
*********************
ADD/UNITS:UNIT-LIST
*********************
```

THE UNITS SPECIFIED ARE ADDED BACK (THEY MUST HAVE BEEN PREVIOUSLY DROPPED BY THE DROP COMMAND) TO THE TEST SEQUENCE. AN ADD CANNOT BE FOLLOWED BY A PROCEED.

```
*******
PRI(NT)
*******
```

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

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

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.

```
*******
FLA(GS)
*******
```

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.

```
********
ZFL(AGS)
********
```

ALL FLAGS ARE CLEARED.

2.4 EXTENDED 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), 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. 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 8 RL UNITS, AND THAT THERE ARE FIVE (5) HARDWARE PARAMETERS FOR EACH (5 SLOTS IN THE P-TABLE, 5 HARDWARE QUESTIONS IN THE DIALOGUE).

FOLLOWING IS THE DIALOGUE FOR THIS 8 RL0X DRIVE SYSTEM. THIS SYSTEM HAS TWO (2) RL11 TYPE CONTROLLERS ALL TO BE SET AT "BR LEVEL" 5. THE FIRST 4 DRIVES ARE RL01'S AND THE LAST 4 DRIVES ARE RL02'S (ON THE SECOND CONTROLLER):

```
  UNITS (D) ? 8

UNIT 0
RL11 (L) Y ?
BUS ADDDRESS (O) 174400 ?
```

```
VECTOR (O) 160 ?
DRIVE (O) 0 ? 0-3
DRIVE TYPE = RL01 (L) Y ?
BR LEVEL (O) 5 ?

UNIT 4
RL11 (L) Y ?
BUS ADDRESS (O) 174400 ? 175400
VECTOR (O) 160 ? 164
DRIVE (O) 0 ? 0-3
DRIVE TYPE = RL01 (L) Y ? N
BR LEVEL (O) 5 ?
```

THE FIRST TIME THRU THE P-TABLE QUESTIONS THE DEFAULT VALUES ARE USED FOR THE CONTROLLER TYPE (QUESTION #1), CSR ADDRESS OF THE CONTROLLER (QUESTION #2), THE CONTROLLER VECTOR ASSIGNMENT (QUESTION #3), THE DRIVE TYPE (QUESTION #5), AND THE "BR LEVEL" (QUESTION #6). THE ACTUAL UNIT NUMBERS OF THE RL01'S FOR QUESTION #4 WAS ASSIGNED 0 THRU 3 FOR THE FIRST 4 P-TABLE SLOTS.

THE SECOND TIME THRU THE P-TABLE QUESTIONS (FOR THE RL02 ASSIGNMENT ON THE SECOND CONTROLLER), THE FIRST QUESTION DEFAULTED TO "RL11" TYPE CONTROLLER. THE SECOND QUESTION WAS ANSWERED TO REFLECT THE CHANGE IN CSR ADDRESS FOR THE RL02 CONTROLLER (175400). THE SECOND CONTROLLER'S VECTOR WAS ALSO CHANGED TO 164 IN QUESTION #3. THE RL02 TEST UNIT NUMBERS WERE ASSIGNED VALUES 0 TO 3 IN QJESTION #4 AND THE DRIVE TYPE WAS SET FOR RL02'S FOR THE REMAINING 4 UNITS IN QUESTION #5. THE LAST QUESTION WAS DEFAULTED USING THE "BR LEVEL" FROM THE FIRST PASS.

2.5 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 RLV11 CONTROLLER.

BUS ADDRESS (O) 174400?

ANSWER WITH THE BUS ADDRESS OF THE CONTROLLER.

VECTOR (O) 160?

ANSWER WITH THE INTERRUPT VECTOR OF THE CONTROLLER.

DRIVE (O) 0?

ANSWER WITH THE DRIVE(S) CONNECTED TO THE CONTROLLER

DRIVE TYPE = RL01 (L) ?

ANSWER NO (N) IF DRIVE IS AN RL02

BR LEVEL (O) 5?

ANSWER WITH THE INTERRUPT PRIORITY OF THE CONTROLLER.

2.6 SOFTWARE PARAMETERS

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

CHANGE S.W. ?

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

EXECUTE DRIVE SELECT TESTS (N)?

IF "YES" TESTS 5 AND 6 ARE EXECUTED IN THE FIRST PASS OF THE PROGRAM. THESE TESTS REQUIRE MANUAL INTERVENTION TO CHANGE ADDRESS PLUGS AND REQUIRE A FULL COMPLEMENT OF ADDRESS PLUGS (0 - 3).

EXECUTE HEAD ALIGNMENT SUPPORT (N)?

IF "YES", TEST 11 IS EXECUTED IN THE FIRST PASS.

EXECUTE MANUAL INTERVENTION TESTS (N)?

IF "YES", TESTS 1, 2, 3, AND 4 ARE EXECUTED TO TEST BASIC INTERFACE OPERATIONS, HEAD LOADING, HEAD UNLOADING, AND ALL STATE CHANGES.

SPECIFY ERROR LIMIT (DECIMAL) (20)?

THIS PARAMETER SPECIFIES THE MAXIMUM NUMBER OF ERRORS ALLOWED. THIS LIMIT IS ON A PER DRIVE BASIS IN A SINGLE PASS. IF THE ERROR LIMIT IS EXCEEDED, THE DRIVE IS DROPPED FROM FURTHER TESTING.

3.0 ERROR INFORMATION

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

3.1 ERROR REPORTING

MOST ERROR REPORTS HAVE THE FOLLOWING FORMAT.

```
    (1)    PROG NAME   ERR NUM   TEST NUM   SUBTEST NUM   ERR PC
    (2)    ROUTINE TRACE SEQ (IN SEQ CALLED)
              (ADDRESS)
              (ADDRESS)
                  .
                  .
              (ADDRESS)
    (3)    TEST DESCRIPTION
    (4)    OPERATION:
    (5)    RESULT:
    (6)    ADDRESS OF UNIT UNDER TEST
    (7)                RLCS    RLDA    RLBA    RLMP    CYL     HD
    (8)    OP INIT
    (9)    OP DONE
    (10)          DRIVE STATUS
    (11)               WORD NUM IS (XXXXXX) SB (YYYYYY)
    (12)    TOTAL COMPARE ERRS: (ZZZ) OF (128)
```

THE ONLY EXCEPTION TO THE ABOVE FORMAT IS PURE DATA COMPARE ERRORS (NOT DETECTED BY READ ERROR). THEN THE FORMAT DOES NOT INCLUDE LINES 5 THROUGH 10.

LINE 1 IS THE ERROR HEADER AND IS PROVIDED BY THE SUPERVISOR. THE PROGRAM IS IDENTIFIED BY NAME WITH THE NUMBER OF TEST AND SUB TEST PRESENTLY BEING EXECUTED.

THE SUBTEST NUMBER IS UNIQUE IN THIS PROGRAM IN THAT IT DOES NOT REFER TO A PHYSICAL SUBTEST WITHIN A GIVEN TEST. RATHER IT REFLECTS THE NUMBER OF TIMES A SUBTEST HAS BEEN EXECUTED WITHIN A TEST. CONSEQUENTLY, ON A TEST THAT TESTS AN INCREMENTAL TYPE OF OPERATION (SUCH AS INCREMENTAL SEEKS, READ ALL HEADERS FROM BOTH SURFACES, ETC.) THE SUBTEST WILL BE DESCRIPTIVE OF WHERE IN THE TEST THE ERROR OCCURRED.

THE ERROR P.C. IS THE PHYSICAL MEMORY LOCATION WHERE THE ERROR REPORT WAS

INITIATED. SINCE MANY FUNCTIONS ARE SUBROUTINED, AND ERRORS ARE REPORTED FROM SUBROUTINES, THE ERROR P.C. IS NOT SUFFICIENT TO IDENTIFY THE LOCATION OF THE ERROR CALL AND THE ROUTINE TRACE SEQUENCE IS PROVIDED.

LINE 2 IS THE ROUTINE TRACE SEQUENCE. IF THE ERROR CALL IS INITIATED FROM WITHIN THE TEST (AS OPPOSED TO WITHIN A ROUTINE), THIS PORTION OF THE REPORT IS OMITTED. IF THE CALL IS INITIATED FROM A ROUTINE (WHICH MAY BE CALLED BY ANOTHER ROUTINE, WHICH MAY BE CALLED BY ANOTHER ROUTINE, ETC. SEVERAL LEVELS DEEP) THE ROUTINE TRACE SEQUENCE PROVIDES A TRAIL TO THE ACTUAL LOCATION WITHIN THE TEST THAT CALLED THE FIRST ROUTINE. THE FIRST ENTRY LISTED IS THE LOCATION WHERE THE FIRST ROUTINE WAS CALLED.

LINE 3 IS THE TEST DESCRIPTION AND IS ROUGHLY IDENTICAL TO THE NAME OF THE TEST BEING PERFORMED.

LINE 4 IDENTIFIES THE ACTUAL HARDWARE FUNCTION THAT IS BEING PERFORMED. ADDITIONAL INFORMATION ON THIS LINE IS DESCRIPTIVE OF SPECIFIC USE OF THE FUNCTION. FOR EXAMPLE, THE OPERATION LINE WILL READ "READ HEADERS FOR 40 HEADERS" WHEN ALL HEADERS ARE BEING READ FROM A TRACK.

LINE 5 IDENTIFIES THE ERROR THAT HAS BEEN DETECTED. THE CONTENT OF LINE 5 IDENTIFIES WHAT WAS BENG TESTED (SUCH AS DRIVE READY, CONTROLLER ERROR, DRIVE STATE, ETC.), WHAT IT IS AND WHAT IT SHOULD BE. LINE 5 MAY BE REPEATED IF MORE THAN ONE TESTED ITEM IS FOUND IN ERROR.

IN ADDITION LINE 5 WILL REPORT ANY HARDWARE DETECTED ERRORS SUCH AS OPERATION INCOMPLETE, HEADER CRC, ETC. IN THIS CASE THE FIRST LINE PRINTED AS RESULT WILL BE DETERMINED BY THE THREE ERROR BITS OPI, HNF/DLT, AND HCRC/DCRC. THE LINE WILL BE DETERMINED AS IN THE FOLLOWING TRUTH TABLE:

HNF/DLT	DCRC/HCRC	OPI	MESSAGE
1	1	1	HDR NOT FND/HDR CRC/OPI ERROR
0	1	1	HDR CRC ERROR
1	0	1	HDR NOT FND ERROR
0	1	0	DATA CRC ERROR
1	0	0	DATA LATE ERROR

LINE 6 IDENTIFIES THE PHYSICAL ADDRESS OF THE UNIT UNDER TEST. THIS ADDRESS IS BY UNIBUS ADDRESS OF THE CONTROLLER AND DRIVE NUMBER.

LINE 7 NAMES THE CONTROLLER REGISTERS (AND CYLINDER AND HEAD WHERE THESE ARE APPLICABLE IN THE REPORT) TO BE REPORTED.

LINE 8 PROVIDES THE CONTENTS OF CONTROLLER REGISTERS WHEN THE OPERATION WAS INITIATED.

LINE 9 PROVIDES THE CONTENTS OF THE CONTROLLER REGISTERS WHEN THE ERROR BEING REPORTED WAS DETECTED. FREQUENTLY THE REGISTER CONTENTS OF OP INIT

AND OP DONE WILL BE DIFFERENT. OP INIT MAY INDICATE A SEEK WAS BEING PERFORMED BUT OP DONE MAY INDICATE THE ERROR WAS DETECTED BY A READ HEADER. THE REASON IS THAT A SEEK WAS EXECUTED AND DID NOT PROPERLY POSITION HEADS AND WHEN THE READ HEADER WAS DONE THE HEADS WERE ON THE WRONG CYLINDER.

LINE 10 IS THE DRIVE STATUS. THIS LINE IS ONLY REPORTED IF THE RLMP REGISTER DOES NOT CONTAIN THE ACTUAL DRIVE STATUS.

LINE 11 AND LINE 12 ARE REPORTED IF THE ERROR WAS DETECTED AS A COMPARE OPERATION, EITHER DATA OR HEADERS. IN ADDITION, GOOD AND BAD DATA IS REPORTED FOR ALL READ ERRORS.

3.1.1 SPECIFIC OPERATION MESSAGES

THE OPERATION MESSAGE (LINE 4) IS GENERATED IN A DYNAMIC MANNER BASED ON THE SUBSYSTEM FUNCTION BEING EXECUTED AT THE TIME OF THE ERROR AND THE STATE OF THE FLAGS IN THE LOCATION TAGGED "OPFLAGS". THE POSSIBLE OPERATION MESSAGES ARE GIVEN BELOW.

SEEK -
FROM (CYL NUM) DIFF (CYL DIFF) SGN (0 OR 1) HD (0 OR 1) WHERE THE VALUES ARE GIVEN IN OCTAL. THIS MESSAGE IS THE RESULT OF A SEEK OPERATION THAT WAS VERIFIED BY A READ HEADER AND THE HEAD POSITION AFTER A SEEK IS IN ERROR. (THE ACTUAL HEAD POSITION IN THIS ERROR SITUATION IS GIVEN IN THE RESULT LINE, LINE 5.)

READ DATA -
IS A READ DATA OPERATION WHERE SOME FORM OF ERROR WAS DETECTED IN THE ACTUAL READ OPERATION. THIS ERROR COULD BE HARDWARE DETECTED SUCH AS DATA CRC, HEADER CRC, HEADER NOT FOUND, ETC., OR A SOFTWARE DETECTED ERROR SUCH AS DRIVE READY RESET AFTER A READ DATA COMPLETED.

READ DATA WITH DATA COMPARE -

IS AN ERROR THAT WAS DETECTED AS BAD DATA IN THE BUFFER AFTER A READ DATA OPERATION. WHEN THIS OPERATION IS REPORTED IT INDICATES THE ACTUAL READ DATA OPERATION COMPLETED WITH NO DETECTED ERRORS BUT THE DATA WAS WRONG.

READ HEADER -
READ HEADER FOR 40 HEADERS -
READ HEADER FOR 40 HEADERS WITH HEADER COMPARE -
HAVE THE SAME GENERAL MEANING AS THE READ DATA AND READ DATA WITH DATA COMPARE. MESSAGES HAVING THE OPERATION OF READ HEADER OR READ HEADER FOR 40 HEADERS ARE THE RESULT OF ERRORS DETECTED IN THE ACTUAL OPERATION WHILE THE READ HEADER FOR 40 HEADERS WITH HEADER COMPARE INDICATES NO ERROR IN THE ACTUAL OPERATION BUT THE HEADER DATA ITSELF WAS IN ERROR.

WRITE DATA -
RESET -
GET STATUS -
GET STATUS WITH RESET -
ARE ALL BASIC OPERATIONS. AS BEFORE, THE ERROR DETECTION CAN BE EITHER HARDWARE OR SOFTWARE. THE RESULT LINE (LINE 5) WILL DEFINE THE REASON FOR THE REPORT.

LD DRV -
UNLD DRV -
ARE OPERATION MESSAGES THAT WILL APPEAR IN THE REPORT WHEN THE DRIVE LOAD AND UNLOAD SEQUENCE IS BEING TESTED.

ANOTHER GROUP OF OPERATION QUALIFIERS WILL BE REPORTED FOR OPERATIONS THAT FAIL IN SPECIFIC TESTS. THESE TESTS ARE THE WRITE/READ TEST PART 2, OVERWRITE TEST, AND THE ADJACENT CYLINDER INTERFERENCE TEST.

OPERATION	QUALIFIER
READ DATA WITH DATA COMPARE	FOL 0 TO CC SEEK
READ DATA	FOL 255 TO CC SEEK
WRITE DATA	FOL WRITE (NO SEEK)
READ HEADER	ADJ. CYL WRITTEN AFTER FWD SK
	ADJ. CYL WRITTEN AFTER REV SK
	SK FWD, WRT-SK REV, OVERWRT
	SK REV, WRT-SK FWD, OVERWRT

THE ABOVE OPERATIONS CAN BE REPORTED WITH ANY OF THE QUALIFIERS. THE QUALIFIERS IN THESE TESTS ARE AN ATTEMPT TO MAKE THE REPORT MORE MEANINGFUL BY PROVIDING INFORMATION ABOUT THE SEQUENCE OF OPERATIONS BEING DONE.

THE QUALIFIERS "FOL 0 TO CC SEEK" AND "FOL 255 TO CC SEEK" INDICATE THAT THE SEQUENCE OF OPERATIONS INCLUDED A SEEK OF A GIVEN DIRECTION TO THE CYLINDER WHERE THE TEST IS BEING PERFORMED.

THE "FOL WRITE (NO SEEK)" QUALIFIER MEANS THAT THE OPERATION WAS DONE AFTER A WRITE WITH NO HEAD MOVEMENT BETWEEN THE WRITE AND READ.

THE QUALIFIER "ADJ CYL WRITTEN AFTER FWD SK" AND "ADJ CYL WRITTEN AFTER REV SK" WILL BE REPORTED ONLY IN THE ADJACENT CYLINDER INTERFERENCE TEST. THESE QUALIFIERS ARE USED WHEN THE ERROR OCCURS ON THE CYLINDER UNDER TEST AND DEFINE THE DIRECTION THE HEADS WERE MOVED WHEN THE ADJACENT CYLINDER WAS WRITTEN.

THE QUALIFIERS "SK FWD, WRT-SK REV, OVERWRT" AND "SK REV, WRT-SK FWD, OVERWRT" WILL BE REPORTED ONLY IN THE OVERWRITE TEST. THESE QUALIFIERS DEFINE THE DIRECTION OF HEAD MOTION BEFORE THE INITIAL WRITE AND THE

OVERWRITE.

THE QUALIFIER ''ON BAD SEC FILES'' WILL BE REPORTED WITH THE WRITE DATA COMMAND IF THE PROGRAM ABORTS THAT COMMAND BECAUSE THE WRITE WOULD BE ON THE BAD SECTOR FILES.

3.1.2 SPECIFIC RESULT MESSAGES

THE RESULT MESSAGE (LINE 5) IS GENERATED DYNAMICALLY BASED ON THE EXPECTED RESULT OF THE OPERATION BEING TESTED. SINCE OPERATIONS ARE MONITORED DURING EXECUTION THE RESULT MESSAGE MAY REPORT AN ERROR DETECTED DURING THE OPERATION AS WELL AS THE ERRORS SEEN AT THE END OF THE OPERATION. ONLY THE FIRST ERROR SEEN IS REPORTED IN ALL CASES.

THE GENERAL FORMAT FOR THE RESULT LINE IS:

RESULT:(VAR 1) IS (VAR 2) SB (VAR 3) (OPTIONAL QUALIFIER)
WHERE VARIABLE 1 CAN BE ONE OF THE FOLLOWING:

CONT ERR	(CONTROLLER ERROR)
DRV ERR	(DRIVE ERROR)
NON-EXSTNT MEM	(NON-EXISTENT MEMORY)
HDR CRC	(HEADER CRC ERROR)
DATA CRC	
HDR NOT FND	(HEADER NOT FOUND)
DATA LATE	
HDR NOT FND/HDR CRC/OPI	(ALL 3 BITS SET)
DRV RDY	(DRIVE READY)
SELECTED HEAD	
VOL CHK	(VOLUME CHECK)
COVER OPEN	
BRUSH HME	(BRUSH HOME)
WRT LCK	(WRITE LOCK)
HDS OUT	(HEADS OUT)
DRV SEL ERR	(DRIVE SELECT ERROR)
DRV STATE	(DRIVE STATE)
SPIN TIMEOUT	(SPINDLE TIMEOUT SPD ERROR)
WRT GAT ERR	(WRITE GATE ERROR)
SEEK TIMEOUT	(SKTO ERROR)
CUR HEAD ERR	(CURRENT IN HEAD ERROR)
WRT DAT ERR	(WRITE DATA ERROR)
OP INCOMPLETE	(OPI ERROR)
HDR/DAT ERR	(HDR CRC OR DATA CRC ERROR BIT 11 OF CS REGISTER)
HDR NOT FND/DAT LATE	(HDR NOT FOUND OR DATA LATE ERROR BIT 12 OF CS REGISTER)
CYL	(CYLINDER WHEN REPORTING A SEEK ERROR)

VARIABLE 2 WILL BE A VALUE THAT DEFINES WHAT THE RESULT ACTUALLY IS.

THIS CAN BE A 1 OR 0 TO INDICATE A SET OF RESULT CONDITIONS, A NUMBER 0 TO 7 TO INDICATE THE DRIVE STATE, OR A NUMBER 0 TO 377 (OCTAL) TO IDENTIFY A CYLINDER NUMBER.

VARIABLE 3 DEFINES THAT THE VALUE GIVEN IS VARIABLE 2 SHOULD BE. THE OPTIONAL QUALIFIER IS PROVIDED WHEN IT IS USEFUL TO KNOW WHEN THE ERROR WAS DETECTED IN THE OPERATION BEING PERFORMED. THIS QUALIFIER IS USED TO REPORT RESULTS SUCH AS:

```
BRUSH HME IS 1 SB 0 IN STATE 2
HEADS OUT IS 0 SB 1 IN STATE 3
DRV RDY   IS 0 SB 1 IN DATA XFER
SELECTED HEAD IS 1 SB 0 IN CYCLE UP
DRV RDY   IS 0 SB 1 IN STATE 5
DRV RDY   IS 1 SB 0 IN SEEK W/O MOTION
DRV RDY   IS 0 SB 1 IN 10MS
DRV RDY   IS 0 SB 1 IN 500MS
DRV RDY   IS 0 SB 1 IN 5SECONDS
```

THESE RESULTS, WHEN SEEN WITH THE OPERATION MESSAGE, WILL BE SELF EXPLANATORY.

OTHER RESULT MESSAGES THAT CAN BE PART OF AN ERROR REPORT ARE:

''INTERRUPT TOO LATE''

WHICH INDICATES THAT THE OPERATION BEING PERFORMED DID NOT COMPLETE IN THE EXPECTED AMOUNT OF TIME. THIS RESULT CAN BE CAUSED BY THE DRIVE LOSING READY BEFORE STARTING A READ HEADER AND THEREFORE NOT COMPLETING THE READ HEADER IN 1MS.

''FAIL TO RELOAD HEADS AFTER ERR CLEAR''

THIS IS REPORTED WHEN AN ERROR CAUSES HEADS TO UNLOAD AND AFTER THE ERROR IS CLEARED THE HEADS DO NOT RELOAD.

''UNKN DRV STATE-NO RDY, NO ERR, HDS OUT''

THIS IS REPORTED WHEN THE PROGRAM CANNOT DETERMINE THE DRIVE STATE OR STATUS.

''WRITE ABORTED''

THIS IS REPORTED WHEN THE PROGRAM ABORTS A WRITE TO PROTECT THE BAD

SECTOR FILES.

"COULD NOT RETRIEVE DRIVE STATUS"

THIS IS REPORTED IF THE GET STATUS COMMAND DOES NOT COMPLETE SUCCESSFULLY WHEN THE STATUS IS REQUIRED TO REPORT AN ERROR.

"OPI SET-NO DRIVE RESPONSE"

THIS IS REPORTED AS THE RESULT WHEN THE GET STATUS COMMAND IS TIMED OUT (OPI SETS) WHEN THAT COMMAND IS BEING USED IN THE EARLY TESTS TO CHECK THE DRIVE INTERFACE.

"NO INTERRUPT ON CMND COMPLETE"

THIS IS REPORTED WHEN THE COMMAND SUCCESSFULLY COMPLETES BUT THE CONTROLLER HAS NOT GENERATED AN INTERRUPT.

"ERR DID NOT CLEAR"

THIS IS REPORTED WHEN THE RESET COMMAND DOES NOT CLEAR THE CONTROLLER ERRORS. THIS IS A CONTROLER RELATED PROBLEM BUT IS REPORTED IF SEEN IN THE DRIVE TEST PROGRAMS.

"DRV ERR IS NOT CLEARED"

THIS IS REPORTED WHEN THE GET STATUS W/RESET COMMAND DOES NOT CLEAR ALL DRIVE ERRORS.

"UNEXPECTED ERR"

THIS IS REPORTED WHEN THE CONTROLLER SENSES AN ERROR BUT NO ERROR BITS ARE SET.

"BAD SEC FILE FMT ERR"

THIS IS REPORTED IF THE CONTENTS OF THE FILES DO NO CORRESPOND TO THE EXPECTED FORMAT. (REFER TO DEC STANDARD 144 FOR FORMAT SPECIFICS.)

3.1.3 OTHER MESSAGES

OTHER INFORMATION IS REPORTED UNDER VARIOUS CIRCUMSTANCES. THESE ARE:

"BAD SEC FILES NOT STRD. ALL SEC ASSUMED GOOD."

THIS MESSAGE IS PRINTED WHEN A PARTICULAR TEST REQUIRES THE BAD SECTOR FILES BUT THEY HAVE NOT BEEN STORED. THIS SITUATION WILL OCCUR IF THIS TEST IS STARTED OUT OF THE NORMAL PROGRAM SEQUENCE OR IF THE BAD SECTOR FILES COULD NOT BE READ.

"ERROR LIMIT EXCEEDED-UNIT DROPPED"

THIS IS REPORTED (WITH THE UNIT NUMBER) WHEN MORE THAN THE SPECIFIED NUMBER OF ERRORS (DEFAULT 20) HAVE OCCURED IN ANY SINGLE PASS.

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

THIS PROGRAM WILL NOT GIVE ANY PERFORMANCE REPORTS.

4.2 PROGRESS REPORTS

THIS PROGRAM WILL NOT GIVE ANY PROGRESS REPORTS.

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 15-7 - CYLINDER ADDRESS FOR TRANSFER
BIT 6 - SURFACE FOR TRANSFER
BIT 5-0 - SECTOR FOR TRANSFER (1-40.)

FOR SEEK FUNCTION
-----------------

BIT 15-7 - DIFFERENCE TO NEW CYLINDER
BIT 6-5 - MUST BE ZERO (0)
BIT 4 - SURFACE (0=UPPER, 1=LOWER)
BIT 3 - MUST BE ZERO (0)
BIT 2 - SEEK DIRECTION( 1=IN / 0=OUT )
BIT 1 - MUST BE ZERO (0)
BIT 0 - MUST BE ONE (1)

FOR GET STATUS FUNCTION
-----------------------

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

RLMP - MULTIPURPOSE REGISTER
----------------------------

FOR READ/WRITE FUNCTION
-----------------------

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

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 - DRIVE TYPE IS RL02 IF SET
BIT  6 - SURFACE (0=UPPPER, 1=LOWER)
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

```
     ---- ---------

TEST 1  BASIC INTERFACE TEST (PART 1)

     LOAD IN DRIVE NUMBER.  DO GET STATUS WITH RESET.  IF OPI SETS:
                    DRIVE INTERFACE IS DEAD
                    DRIVE COMMAND SHIFT REGISTER NOT LOADING/SHIFTING
                    MARKER DETECTION FAILED
                    DRIVE IS NOT SELECTING OR AC LOW IS SET

                    SYSTEM OR STATUS CLOCKS NOT OPERATIONAL
                    GET STATUS DETECTION FAILED.

     IF INTERRUPT WITH NO OPI, CHECK STATUS RECEIVED.   COVER  OPEN
     AND BRUSH HOME SHOULD BE SET.  IF NOT:
                    BAD STATUS DATA LINE
                    BAD COVER SWITCH OR LOGIC
                    DRIVE COMMAND SHIFT REGISTER
                    BAD BRUSH HOME SWITCH OR LOGIC

     CHECK WRITE LOCK STATUS BIT SET.  IF NOT:
                    BAD SWITCH OR WRITE LOCK LOGIC
                    DRIVE COMMAND SHIFT REGISTER

     CHECK STATE FOR 0.  IF NOT:
                    BAD STATE ROM
                    DRIVE COMMAND SHIFT REGISTER

     CHECK VOLUME CHECK RESET.  IF NOT:
                    BAD RESET DETECTION
                    BAD VOLUME CHECK LOGIC
                    DRIVE COMMAND SHIFT REGISTER

     CHECK DRIVE ERROR RESET.  IF NOT:

                    BAD DRIVE ERROR INTERFACE
                    SOME OTHER ERROR STUCK ON. REPORT WHICH ERROR.

     NOTE:    THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2
              IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED,
              AND IS RUN IN FIRST PASS ONLY.

TEST 2  BASIC INTERFACE TEST (PART 2)

     REQUEST OPERATOR TO CLOSE COVER AND RESET WRITE LOCK.

     DO GET STATUS LOOP  CHECKING  IF  COVER  OPEN  OR  WRITE  LOCK
     RESETS.   WAIT  15  SECONDS FOR BOTH TO CHANGE.  IF NO CHANGE,
     ASK OPERATOR TO TYPE CR IF PROCEDURE WAS FOLLOWED.
     IF ONE CHANGED BUT NOT THE OTHER, REPORT WHICH FAILURE:

                    WRITE LOCK SWITCH OR LOGIC
                    (OR) COVER OPEN SWITCH OR LOGIC
                    DRIVE COMMAND SHIFT REGISTER

     IF NEITHER CHANGED, REPORT BOTH FAILURES.

     NOTE:    THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2
              IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED,
              AND IS RUN IN FIRST PASS ONLY.


TEST 3  HEAD LOADING TEST

     REQUEST OPERATOR TO PRESS LOAD SWITCH.

     DO GET STATUS LOOP CHECKING FOR STATE TO GO  TO  1.   WAIT  30
     SECONDS  FOR  CHANGE.   IF  NO CHANGE, ASK OPERATOR TO CONFIRM
     ACTION BY TYPING CR.

     IF LOAD WAS PRESSED:

                    BAD STATE ROM
                    BAD LOAD SWITCH OR LOGIC

     CHECK THAT STATE 1 REMAINS FOR LESS THAN 30 SECONDS.  IF NOT:

                    SPINDLE NOT TURNING OR TOO SLOW (AC SERVO)
                    SECTOR PULSE DETECTION OR LOGIC BAD
                    BAD CLOCK SHIFT REGISTER IN SPEED CONTROL
                    BAD DISK ON SPEED LOGIC
                    BAD STATE ROM

     AND CHECK IF SPINUP TIMEOUT ERROR SET.  IF NOT:

                    BAD STATE ROM
                    BAD TIMEOUT DETECTION LOGIC

     CHECK THAT STATE GOES TO 2 OR 3 (WHICH STATE DEPENDS ON WHETHER
         THE DRIVE HAS A BRUSH).  IF NOT:

                    BAD STATE ROM

     IF THE DRIVE HAS A BRUSH, CHECK THAT BRUSH HOME IS RESET 5
         SECONDS OR LESS  AFTER  STATE IS 2.  IF NOT:

                    BAD BRUSH HOME SWITCH OR LOGIC
                    BAD BRUSH MOTOR (AC SERVO)
```

```
    WAIT 30 SECONDS FOR BRUSH HOME TO SET.  IF NOT:

                BAD AC SERVO
                BAD SWITCH OR LATCH

    CHECK THAT STATE HAS CHANGED TO 3.  IF NOT:

                BAD STATE ROM

    AFTER STATE IS 3, CHECK HEADS OUT IS SET.  IF NOT:

                BAD SWITCH
                BAD SEEK CONTROL ROM
                BAD VELOCITY ROM
                BAD DC SERVO

    CHECK IF DRIVE ERROR IS SET.  IF NOT:

                BAD DRIVE ERROR LOGIC OR INTERFACE

    WAIT 300 MS FOR STATE TO CHANGE TO 4.  IF IT DOESN'T CHANGE:

                STATE ROM BAD
                SEEK ROM
                VEL ROM
                GUARD BAND DETECTION

    WAIT 15 MS FOR STATE TO CHANGE TO 5.

    CHECK VOLUME CHECK IS SET.  IF NOT:

                BAD VOLUME CHECK LOGIC

    8 MS AFTER STATE GOES TO 5, DRIVE READY SHOULD SET.  IF NOT:

                INTEGRATOR OR NULL DETECTION FAILURE
                READY ONE SHOT BAD
                ENABLE TIMEOUT H NOT SETTING OR COUNT LOGIC BAD

    NOTE:    THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2
             IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED,
             AND IS RUN IN FIRST PASS ONLY.


TEST 4  HEAD UNLOADING TEST

    CHECK DRIVE IS READY.  IF NOT REPORT AND ASK OPERATOR TO  MAKE
    DRIVE READY.

    REQUEST OPERATOR TO UNLOAD DRIVE.
```

LOOP ON GET STATUS WAITING FOR STATE TO CHANGE TO 6. IF NO CHANGE:

BAD STATE ROM
BAD SWITCH

WAIT 300 MS FOR STATE TO CHANGE TO 7. IF NO CHANGE:

BAD STATE ROM

AFTER STATE IS 7, WAIT 30 SEC FOR STATE TO CHANGE TO STATE 0. IF NO CHANGE:

NO BRAKING
BAD AC SERVO

REQUEST OPERATOR TO LOAD DRIVE. WAIT UNTIL DRIVE BECOMES READY.

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2 IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED, AND IS RUN IN FIRST PASS ONLY.

TEST 5 DRIVE SELECT TEST

INSTRUCT THE OPERATOR TO REMOVE DRIVE ADDRESS PLUGS FROM ALL DRIVES EXCEPT THE DRIVE UNDER TEST. ASK THAT CARRIAGE RETURN BE TYPED WHEN DONE.

DO GET STATUS TO ADDRESS OF DRIVE UNDER TEST. CHECK THAT NO ERRORS ARE REPORTED. DO GET STATUS TO ALL OTHER ADDRESSES AND CHECK THAT OPI SETS FOR ALL OTHER ADDRESSES.

DO GET STATUS TO ADDRESS OF NEXT SEQUENTIAL ADDRESS. CHECK THAT NO ERRORS ARE REPORTED. DO GET STATUS TO ALL OTHER ADDRESSES AND CHECK THAT OPI SETS.

REPEAT FOR ALL DRIVE ADDRESSES (0,1,2,3 - 0 IS SEQUENTIAL AFTER 3).

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2 IS SELECTED, DRIVE SELECT TESTING IS REQUESTED, AND IS RUN IN FIRST PASS ONLY.

TEST 6 DRIVE SELECT ERROR TEST

REQUEST OPERATOR INSERT IDENTICAL ADDRESS PLUGS IN TWO DRIVES

(MUST BE IDENTICAL TO NUMBER SPECIFIED EARLIER). REQUEST OPERATOR TYPE CARRIAGE RETURN WHEN READY.

PROCEDURE WILL BE TO GET STATUS AND CHECK FOR DRIVE SELECT ERROR. THEN RESET THAT DRIVE AND VERIFY THAT DRIVE SELECT ERROR IS NOT REPORTED AGAIN. WAIT 1 SECOND, THEN CHANGE DRIVE SELECT TO A DIFFERENT NUMBER AND BACK AGAIN. DRIVE SELECT ERROR SHOULD SET AGAIN.

OPERATOR SHOULD SEE THE FAULT LIGHT ON ON BOTH DRIVES. IF INDICATOR IS NOT SEEN ON A DRIVE:

DRIVE SELECT ERROR DETECTION IS BAD IN THAT DRIVE.

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2 IS SELECTED, DRIVE SELECT TESTING IS REQUESTED, AND IS RUN IN FIRST PASS ONLY.

TEST 7 INITIAL STATE TEST

INSTRUCT OPERATOR TO GO THROUGH A LOAD HEADS CYCLE TO
INITIALIZE
THE TEST.

DO GET STATUS, WAIT FOR INTERRUPT.

IF OPI OCCURS:

DRIVE INTERFACE IS DEAD
DRIVE COMMAND SHIFT REGISTER NOT LOADING/SHIFTING
DRIVE IS NOT SELECTING OR AC LOW IS SET
SYSTEM OR STATUS CLOCKS NOT OPERATIONAL
GET STATUS DETECTION FAILED.

IF INTERRUPT OCCURS WITHOUT OPI, CHECK DRIVE READY. READY SET INDICATES HEADS ARE LOADED AND ARE TRACKING (POSITION WORKING).

IF MANUAL INTERVENTION TESTS WERE RUN, CHECK THAT HEAD 0 IS SELECTED. IF NOT:

DRIVE CYCLE UP DID NOT SELECT HEAD 0

IF DRIVE READY IS SET, CHECK STATUS MESSAGE RECEIVED. HEADS OUT AND BRUSH HOME MUST BE SET. IF NOT:

DRIVE COMMAND SHIFT REGISTER NOT LOADING/SHIFTING
HEADS OUT OR BRUSH HOME SWITCH OR ASSOCIATED
CIRCUITRY BAD

STATUS DATA BAD

IF MANUAL INTERVENTION TESTS WERE RUN AND THIS IS THE FIRST PASS CHECK THAT VOLUME CHECK AND DRIVE ERROR ARE SET.

CHECK ALL ERROR BITS ARE 0.

CHECK STATE IS 5. IF NOT:

DRIVE COMMAND SHIFT REGISTER BAD

NOTE: THIS TEST IS EXECUTED IF PROGRAM MODE 2 IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED, AND IS RUN IN FIRST PASS ONLY.

TEST 8 INITIAL RESET STATE TEST

DO GET STATUS HEAD SELECT = 0, WAIT FOR INTERRUPT.

DO GET STATUS WITH RESET, WAIT FOR INTERRUPT. BOTH DRIVE ERROR AND VOLUME CHECK SHOULD NOW BE RESET. IF NOT:

RESET DETECTION, RESET ERROR, OR VOLUME CHECK FLOP BAD

DRIVE COMMAND SHIFT REGISTER BAD

HEAD SELECTED BIT SHOULD STILL BE ZERO. IF NOT:

DRIVE COMMAND SHIFT REGISTER BAD
HEAD SELECT SHIFT REGISTER NOT LOADING

NOTE: THIS TEST IS EXECUTED IF PROGRAM MODE 2 IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED, AND IS RUN IN FIRST PASS ONLY.

TEST 9 DRIVE READY TEST

DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 0. WAIT FOR INTERRUPT. GET STATUS. CHECK STATE IS 5. IF NOT:

DIFFERENCE COUNTER PICKING UP BITS
COUNTER CIRCUITRY IS NOT INDICATING 0 DIFFERENCE

CHECK DRIVE READY IS RESET. IF NOT:

ENABLE TIMEOUT OR READY LATCH/ONE SHOT BAD

WAIT APPROX 8 MS FOR READY TO SET. IF IT TAKES LONGER OR DOESN'T SET AT ALL:

```
                HEADS MAY HAVE MOVED (INTEGRATOR OR NULL DETECTION)
                READY ONE SHOT FAILED

    CHECK DRIVE ERROR DID NOT SET.  IF IT SET, DO GET  STATUS  AND
    REPORT WHICH ERROR.

    VERIFY HEAD SELECT IS ZERO.

TEST 10 SEEK SIGN SWITCH TEST

    DO  SEEK  WITH  DIFFERENCE  0,  SIGN  1,  HEAD  0.   WAIT  FOR
    INTERRUPT.  GET STATUS AND CHECK STATE IS 5.  IF NOT:

                COUNT ROM
                DIFFERENCE COUNTER PICKING UP BITS
                COUNTER CIRCUITRY IS NOT INDICATING 0 DIFFERENCE

    VERIFY DRIVE IS NOT READY

    WAIT APPROX 8 MS FOR READY TO SET.   IF  IT  TAKES  LONGER  OR
    DOESN'T SET AT ALL:

                HEADS ARE MOVING (INTEGRATOR OR NULL DETECTION)
                READY ONE SHOT FAILED
                COUNT ROM

    VERIFY DRIVE ERROR DID NOT SET

    VERIFY HEAD SELECT IS ZERO.

    DO SEEK WITH 0 DIFFERENCE,  OPPOSITE  SIGN,  HEAD  0.   REPEAT
    ABOVE TESTS.


TEST 11 HEAD ALIGNMENT SUPPORT ROUTINE

    THIS TEST IS EXECUTED WHEN HEAD ALIGNMENT SUPPORT IS REQUESTED,

    AND IN THE FIRST PASS ONLY.

*****************************************************************
        NOTE:   THE NULL DETECTOR AND SEEK TIMEOUT SHOULD BE
                GROUNDED ON THOSE DRIVES WHICH LACK THE HEAD
                SELECT TEST POINTS. THE TEST WILL NOT SWITCH
                HEADS IF THERE IS A DRIVE FAULT.
*****************************************************************

    THIS TEST SELECTS THE DRIVE UNDER TEST  AND  LOOPS  ON  A  GET
    STATUS  WITH  RESET.  THE WRITE LOCK BIT IS MONITORED AND WHEN
```

WRITE LOCK IS RESET HEAD 0 IS SELECTED AND WHEN WRITE LOCK IS SET HEAD 1 IS SELECTED. THIS WILL PERMIT THE HEADS TO BE ALIGNED IN KEEPING WITH THE PRESENT HEAD ALIGNMENT PROCEDURE WITHOUT RETURNING TO THE CONSOLE.

TYPING A CARRIAGE RETURN ON THE CONSOLE WILL TERMINATE THIS TEST ON THE DRIVE UNDER TEST. BEFORE TERMINATING, THE TEST WILL CHECK THAT WRITE LOCK IS RESET. IF NOT, THE OPERATOR WILL BE REQUESTED TO RESET WRITE LOCK.

TEST 12 HEAD SWITCHING TEST

DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 1. WAIT FOR INTERRUPT. GET STATUS AND CHECK STATE IS 5. IF NOT:

> DIFFERENCE COUNTER IS PICKING UP BITS
> ASSOCIATED CIRCUITRY IS BAD

VERIFY DRIVE READY RESET. IF NOT:

> ENABLE TIMEOUT OR READY LATCH/ONE SHOT BAD

WAIT APPROX 8 MS FOR READY TO SET. IF IT TAKES LONGER OR DOESN'T SET AT ALL:

> HEADS ARE MOVING (INTEGRATOR OR NULL DETECTION)
> READY ONE SHOT FAILED
> DRIVE CANNOT TRACK WITH THIS HEAD

VERIFY DRIVE ERROR DID NOT SET.

DO GET STATUS, CHECK HEAD SELECT IS CORRECT. IF NOT:

> HEAD SELECT REGISTER BAD
> DRIVE COMMAND SHIFT REGISTER BAD

DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 0. REPEAT ABOVE TESTS.

TEST 13 READ HEADER TEST (PART 1)

DO SEEK WITH DIFFERENCE 0, HEAD 0, SIGN 0. WAIT FOR INTERRUPT AND WAIT FOR DRIVE READY.

DO READ HEADER, WAIT FOR INTERRUPT.

CHECK IF HEADER CRC ERROR SET. IF SET:

READ/WRITE BOARD BAD
READ DATA LINE BAD

CHECK IF BIT 6 OF WORD 1 IS SAME AS HEAD SELECT BIT IN STATUS. IF NOT:

HEADS ARE SWITCHED (CABLE)
HEAD SELECT LOGIC

IF MANUAL INTERVENTION TESTS WERE RUN AND HEAD ALIGNMENT TESTS WERE NOT RUN, CHECK THAT HEADER WORD 0 INDICATES HEADS ARE POSITIONED OVER CYLINDER 0. STORE HEADER WORD 1.

REPEAT TESTS USING HEAD 1.

CHECK THAT CYLINDER PORTION OF STORED HEADER WORD 1 IS THE SAME AS HEADER WORD 1 OF THIS HEADER. IF NOT:

HEADS ARE MISALIGNED

TEST 14 READ HEADER TEST (PART 2)

DO SEEK WITH DIFFERENCE 0, SIGN 0, HEAD 0. WAIT FOR INTERRUPT. WAIT FOR READY.

DO 40 CONSECUTIVE READ HEADER, STORE 3 HEADER WORDS AFTER EACH READ.

CHECK ALL HEADERS FOR SEQUENCE AND CONTENT (WORD 2 ALL ZERO, BIT 15 WORD 1 AND 3 IS 0, HS BIT WORD 1 IS 0). IF NOT:

BAD READ/WRITE BOARD
BAD PACK

DO SEEK WITH DIFFERENCE 0, SIGN 0, HEAD 1. REPEAT ABOVE TEST FOR HEAD 1.

TEST 15 DIFFERENCE OF 1 SEEK TEST (PART 1)

DO READ HEADER, WAIT FOR INTERRUPT. STORE WORD 1 OF HEADER.
DO SEEK WITH DIFFERENCE OF 1, HEAD 0. IF CYLINDER OF STORED HEADER WORD IS NOT 255 THEN SIGN BIT 1, ELSE SIGN BIT 0. WAIT FOR INTERRUPT.
DO GET STATUS, WAIT FOR INTERRUPT. CHECK STATE IS 4. IF NOT:

DRIVE COMMAND SHIFT REGISTER BAD
DIFFERENCE REGISTER DROPPED BIT
STATE ROM FAILED

WAIT APPROX 20 MS. DO GET STATUS, WAIT FOR INTERRUPT. CHECK STATE IS 5. IF NOT:

DIFFERENCE REGISTER NOT COUNTING
COUNT PULSE NOT GENERATED (COUNT LOGIC)
SEEK ROM FAILED
FAILURE IN DC SERVO
NO TACH FEEDBACK

WAIT APPROX 5 MS LONGER. TEST DRIVE READY. IF SET:

FAILURE IN READY LATCH OR INTEGRATOR

WAIT APPROX 5 MS LONGER. TEST READY. IF RESET:

FAILURE IN INTEGRATOR
UNEXPECTED GUARD BAND DETECTED

DO SEEK WITH DIFFERENCE 1, OPPOSITE SIGN, HEAD 0. REPEAT ALL TESTS AS ABOVE.

REPEAT TEST USING HEAD 1.

NOTE: THIS TEST IS PERFORMED AT THE CYLINDER POSITION FOUND IN THE DRIVE WHEN THE TEST EXECUTES. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.

TEST 16 DIFFERENCE OF 1 SEEK TEST (PART 2)

DO READ HEADER, WAIT FOR INTERRUPT. STORE WORD 1 OF HEADER.

DO SEEK WITH DIFFERENCE OF 1, HEAD 0. IF CYLINDER OF STORED HEADER WORD IS NOT "HILIMIT" THEN SIGN BIT 1, ELSE SIGN BIT 0. WAIT FOR INTERRUPT, WAIT FOR DRIVE READY.

DO READ HEADER, WAIT FOR INTERRUPT. COMPARE CYLINDER OF THIS HEADER WITH CYLINDER OF STORED HEADER FOR DIFFERENCE OF ONE. IF NOT:

COUNT LOGIC BAD
INTEGRATOR FAILED

CHECK THAT HEADS MOVED FORWARD OR REVERSE AS EXPECTED. IF NOT:

SEEK ROM FAILED

DO SEEK WITH DIFFERENCE OF 1, OPPOSITE SIGN, HEAD 0. REPEAT ALL TESTS AS ABOVE.

```
        REPEAT TEST USING HEAD 1.

        NOTE:   THIS TEST IS PERFORMED AT THE CYLINDER POSITION  FOUND
                IN  THE  DRIVE  WHEN  THE  TEST  EXECUTES.  CHOOSING A
                SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.

   @
```

```
        000001          PART1==1
000000                  .ENABLE ABS
                        .LIST   MC
                        .NLIST  MD,ME,CND,TOC
        002000                  .=2000
                                .MCALL  SVC

002000                          SVC
        000001                  SVCTST=1
        000001                  SVCSUB=1
        000001                  SVCBGL=1
        000000                  SVCINS=0
        000000                  SVCTAG=0
002000                          POINTER BGNSW,BGNSFT,BGNDU

002000                  BGNMOD  MDHEDR
002000                  HEADER  CZRLI,D,0,1,0
002000     103                  .ASCII /C/
002001     132                  .ASCII /Z/
002002     122                  .ASCII /R/
002003     114                  .ASCII /L/
002004     111                  .ASCII /I/
002005     000                  .BYTE   0
002006     000                  .BYTE   0
002007     000                  .BYTE   0
002010     104                  .ASCII  /D/
002011     060                  .ASCII  /0/
002012  000000                  .WORD   0
002014  000001                  .WORD   1
002016  040376                  .WORD   L$HARD
002020  040552                  .WORD   L$SOFT
002022  014310                  .WORD   L$HW
002024  014326                  .WORD   L$SW
002026  040764                  .WORD   L$LAST
002030  000000                  .WORD   0
002032  000000                  .WORD   0
002034  000000                  .WORD   0
002036  000000                  .WORD   0
002040  014344                  .WORD   L$DISPATCH
002042  000000                  .WORD   0
002044  000000                  .WORD   0
002046  000000                  .WORD   0
002050     003                  .BYTE   C$REVISION
002051     003                  .BYTE   C$EDIT
002052  000000                  .WORD   0
002054  000000                  .WORD   0
002056  000000                  .WORD   0
002060  002212                  .WORD   L$DVTYP
002062  000000                  .WORD   0
002064  000000                  .WORD   0
002066  000000                  .WORD   0
002070  000000                  .WORD   0
002072  016364                  .WORD   L$DU
002074  000000                  .WORD   0
002076  002122                  .WORD   L$DESC
002100  104035                  EMT     E$LOAD
002102  000000                  .WORD   0
```

```
002104  014412                                  .WORD   L$INIT
002106  016174                                  .WORD   L$CLEAN
002110  015636                                  .WORD   L$AUTO
002112  014404                                  .WORD   L$PROT
002114  000000                                  .WORD   0
002116  000000                                  .WORD   0
002120  000000                                  .WORD   0
002122                                  ENDMOD

002122                                  DESCRIPT        <CZRLI TESTS THE RL01-02 INTERFACE AND BASIC DRIVE LOGIC>
002122     103      132      122                .ASCIZ  /CZRLI TESTS THE RL01-02 INTERFACE AND BASIC DRIVE LOGIC/
002125     114      111      040
002130     124      105      123
002133     124      123      040
002136     124      110      105
002141     040      122      114
002144     060      061      055
002147     060      062      040
002152     111      116      124
002155     105      122      106
002160     101      103      105
002163     040      101      116
002166     104      040      102
002171     101      123      111
002174     103      040      104
002177     122      111      126
002202     105      040      114
002205     117      107      111
002210     103      000
                                                .EVEN

002212                                          DEVTYP  <RL01,RL02>
002212     122      114      060                .ASCIZ  /RL01,RL02/
002215     061      054      122
002220     114      060      062
002223     000
                                                .EVEN

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```
                                        .SBTTL  BIT AND OFFSET DEFINITIONS

  002224                                BGNMOD  GLBEQAT

  002224                                EQUALS
                                        ;
                                        ; BIT DIFINITIONS
                                        ;
                100000                  BIT15== 100000
                040000                  BIT14== 40000
                020000                  BIT13== 20000
                010000                  BIT12== 10000
                004000                  BIT11== 4000
                002000                  BIT10== 2000
                001000                  BIT09== 1000
                000400                  BIT08== 400
                000200                  BIT07== 200
                000100                  BIT06== 100
                000040                  BIT05== 40
                000020                  BIT04== 20
                000010                  BIT03== 10
                000004                  BIT02== 4
                000002                  BIT01== 2
                000001                  BIT00== 1
                                        ;
                001000                  BIT9==  BIT09
                000400                  BIT8==  BIT08
                000200                  BIT7==  BIT07
                000100                  BIT6==  BIT06
                000040                  BIT5==  BIT05
                000020                  BIT4==  BIT04
                000010                  BIT3==  BIT03
                000004                  BIT2==  BIT02
                000002                  BIT1==  BIT01
                000001                  BIT0==  BIT00
                                        ;
                                        ; EVENT FLAG DEFINITIONS
                                        ;    EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                        ;
                000040                  EF.START==      32.                             ; START COMMAND WAS ISSUED
                000037                  EF.RESTART==    31.                             ; RESTART COMMAND WAS ISSUED
                000036                  EF.CONTINUE==   30.                             ; CONTINUE COMMAND WAS ISSUED
                000035                  EF.NEW==        29.                             ; A NEW PASS HAS BEEN STARTED
                000034                  EF.PWR==        28.                             ; A POWER-FAIL/POWER-UP OCCURRED
                                        ;
                                        ;
                                        ; PRIORITY LEVEL DEFINITIONS
                                        ;
                000340                  PRI07== 340
                000300                  PRI06== 300
                000240                  PRI05== 240
                000200                  PRI04== 200
                000140                  PRI03== 140
                000100                  PRI02== 100
                000040                  PRI01== 40
                000000                  PRI00== 0
                                        ;
```

```
                                  ;OPERATOR FLAG BITS
                                  ;
        000004                    EVL==        4
        000010                    LOT==       10
        000020                    ADR==       20
        000040                    IDU==       40
        000100                    ISR==      100
        000200                    UAM==      200
        000400                    BOE==      400
        001000                    PNT==     1000
        002000                    PRI==     2000
        004000                    IXE==     4000
        010000                    IBE==    10000
        020000                    IER==    20000
        040000                    LOE==    40000
        100000                    HOE==   100000

                                  ;       OFFSETS FOR HARDWARE P-TABLE
        000000                    CSR     =0                      ;BUS ADDRESS
        000002                    VECT    =2                      ;VECTOR ADDRESS
        000004                    PRIOR   =4                      ;PRIORITY
        000006                    TYPDR   =6                      ;DRIVE TYPE
        000010                    DRSB    =10                     ;DRIVE SELECT
        000012                    CNT     =12                     ;CONTROLLER TYPE

                                  ;       OFFSETS FOR SOFTWARE P-TABLE
        000000                    MISWI   =0                      ;SOFTWARE PARAMETERS SWITCHES
        000002                    LOLIM   =2                      ;CYLINDER LOWER LIMIT
        000004                    HILIM   =4                      ;CYLINDER HIGH LIMIT
        000006                    HEAD    =6                      ;SELECTED HEAD FOR RUNNING TESTS
        000010                    ERLIM   =10                     ;ERROR LIMIT
        000012                    DCLIM   =12                     ;DATA COMPARE ERROR LIMIT

                                  ;       BIT ASSIGNMENTS FOR SOFTWARE P-TABLE SWITCHES
        000001                    ALLCYL  =BIT00                  ;USE ALL CYLINDERS
        000002                    ALLSEC  =BIT01                  ;USE ALL SECTORS
        000004                    DRSELT  =BIT02                  ;EXECUTE DRIVE SELECT TEST
        000010                    HDALIGN =BIT03                  ;EXECUTE HEAD ALIGNMENT TEST
        010000                    HEADLM  =BIT12                  ;HEAD LIMIT SPECIFIED FLAG
        020000                    HICYL   =BIT13                  ;HI LIMIT SPECIFIED FLAG
        040000                    LOCYL   =BIT14                  ;LO LIMIT SPECIFIED
        100000                    MITEST  =BIT15                  ;EXECUTE MANUAL INTERVENTION TESTS

                                  ;       SUBSYSTEM FUNCTIONS
        000102                    CKDATA  =102                    ;WRITE CHECK
        000104                    GTSTAT  =104                    ;GET STATUS
        000106                    SEEK    =106                    ;SEEK
        000110                    RDHEAD  =110                    ;READ HEADER
        000112                    WTDATA  =112                    ;WRITE DATA
        000114                    RDDATA  =114                    ;READ DATA
        000116                    RDNOHR  =116                    ;READ DATA, IGNORE HEADERS
        000100                    NOOP    =100                    ;NO OPERATION

                                  ;       OPERATION FLAGS
        007777                    COMPOP  =7777                   ;COMPOSITE OPERATION FLAGS
        000002                    HDRCMP  =BIT01                  ;HEADER COMPARE OPERATION
        000001                    DATACMP =BIT00                  ;DATA COMPARE OPERATION
        000004          CYLUP   =BIT02                  ;CYCLE UP OPERATION
        000010          ULOAD   =BIT03                  ;UNLOAD OPERATION
        000020          INOUTS  =BIT04                  ;IN-OUT SEEK OPERATION
        000040          OUTINS  =BIT05                  ;OUT-IN SEEK OPERATION
        000100          FOLWRT  =BIT06                  ;FOLLOWING WRITE OPERATION
        000200          REVSKS  =BIT07                  ;REV SEEK SEQ (ADJ INTERFERENCE)
        000400          FWDSKS  =BIT08                  ;FWD SEEK SEQ (ADJ INTERFERENCE)
        001000          REVSKO  =BIT09                  ;REV SEEK SEQ (OVERWRITE)
        002000          FWDSKO  =BIT10                  ;FWD SEEK SEQ (OVERWRITE)
        004000          BADADD  =BIT11                  ;BAD DISK ADDRESS
        010000          SEEKOP  =BIT12                  ;SEEK OPERATION
        020000          RORWOP  =BIT13                  ;READ OR WRITE OPERATION
        040000          RELDWT  =BIT14                  ;RELOAD WAIT
        100000          HDR40   =BIT15                  ;40 HEADER OPERATION
        003760          MQUALS  =OUTINS!INOUTS!FOLWRT!REVSKS!FWDSKS!REVSKO!FWDSKO
                                                        ;MESSAGE QUALIFIER BITS

                        ;       ERROR FLAGS FROM SUBROUTINES
        000001          TOSLOW  =BIT00                  ;OPERATION TOOK TOO LONG
        000002          NOIRPT  =BIT01                  ;NO INTERRUPT FROM OPERATION
        000004          CONHNG  =BIT02                  ;CONTROLLER HUNG
        000010          NOCLR   =BIT03                  ;BAD CONTROLLER CLEAR

        000000          RLCS    =0                      ;CONTROL AND STATUS REGISTER
        000002          RLBA    =2                      ;BUS ADDRESS REGISTER
        000004          RLDA    =4                      ;DISK ADDRESS REGISTER
        000006          RLMP    =6                      ;MULTI-PURPOSE REGISTER

                        ;       REGISTER BIT DEFINITIONS - CONTROL STATUS REGISTER
        000000          RLCSR   =0                      ;CONTROL AND STATUS REGISTER
        100000          ANYERR  =100000                 ;ANY ERROR BIT
        040000          DRVERR  =40000                  ;DRIVE ERROR BIT
        020000          NXMERR  =20000                  ;NON-EXISTENT MEMORY ERROR
        010000          DLTERR  =10000                  ;DATA LATE ERROR
        010000          HNFERR  =10000                  ;HEADER NOT FOUND ERROR
        004000          DCKERR  =4000                   ;DATA CHECK ERROR
        004000          HCRCERR =4000                   ;HEADER CHECK ERROR
        002000          OPIERR  =2000                   ;OPERATION INCOMPLETE ERROR
        001400          DSMSK   =1400                   ;DRIVE SELECT MASK
        000200          CRDYMSK =200                    ;CONTROLLER READY MASK
        000100          INTEBL  =100                    ;INTERRUPT ENABLE MASK
        000060          BAMSK   =60                     ;BUS ADDRESS UPPER MASK
        000001          DRDYMSK =1                      ;DRIVE READY MASK
```

```
                                        ;       REGISTER BIT DEFINITIONS - DISK ADDRESS FOR DATA XFER
              000077                    SAMSK   =77                     ;SECTOR ADDRESS MASK
              000100                    HSMSK   =100                    ;HEAD SELECT MASK

                                        ;       REGISTER BIT DEFINITIONS - DISK ADDRESS FOR SEEK
              000001                    MBSETO  =1                      ;MUST BE SET, BIT 0
              000004                    DIRBIT  =4                      ;DIRECTION BIT
              000020                    HDSEL   =20                     ;HEAD SELECT BIT

                                        ;       REGISTER BIT DEFINITIONS - DISK ADDRESS FOR GET STATUS
              000003                    GETSTAT =3                      ;GET STATUS SETUP
              000010                    DRSET   =10                     ;DRIVE RESET MASK

                                        ;       REGISTER BIT DEFINITIONS - MP FOR DATA XFER
              017777                    WCMSK   =17777                  ;WORD COUNT MASK
              160000                    WCRNG   =160000                 ;WORD COUNT RANGE MASK

                                        ;       REGISTER BIT DEFINITIONS - MP FOR READ HEADER
              000077                    HDSEC   =77                     ;SECTOR MASK
              000100                    HDHSEL  =100                    ;HEAD SELECT MASK

                                        ;       REGISTER BIT DEFINITIONS - MP FOR GET STATUS
              000007                    STAMSK  =7                      ;STATE MASK
              000010                    BHSTAT  =10                     ;BRUSH HOME STATUS
              000020                    HOSTAT  =20                     ;HEADS OUT STATUS
              000040                    COSTAT  =40                     ;COVER OPEN STATUS
              000100                    HSSTAT  =100                    ;HEAD SELECT STATUS
              000400                    DSESTAT =400                    ;DRIVE SELECT ERROR STATUS
              001000                    VCSTAT  =1000                   ;VOLUME CHECK STATUS
              002000                    WGESTAT =2000                   ;WRITE GATE ERROR STATUS
              004000                    SPDSTAT =4000                   ;SPIN ERROR STATUS
              010000                    STOSTAT =10000                  ;SEEK TIMEOUT ERROR STATUS
              020000                    WLSTAT  =20000                  ;WRITE LOCK STATUS
              040000                    HCESTAT =40000                  ;HEAD CURRENT ERROR STATUS
              100000                    WDESTAT =100000                 ;WRITE DATA ERROR STATUS

       002224                           ENDMOD
```

```
      1
      2                                   .SBTTL  MACRO DEFINITIONS
      3
      4                                   ;DELAY EXECUTION OF PROGRAM A SPECIFIED NUMBER OF 100-MILLISECOND TIME COUNTS.
      5                                   ;THIS TIMING IS PERFORMED BY SOFTWARE USING CPU TIMING AND IS HIGHLY MACHINE
      6                                   ;DEPENDENT.
     17
     18                                   ;DELAY EXECUTION OF PROGRAM A SPECIFIED NUMBER OF 100-MICROSECOND TIME COUNTS.
     19                                   ;THIS TIMING IS PERFORMED BY SOFTWARE USING CPU TIMING AND IS HIGHLY MACHINE
     20                                   ;DEPENDENT.
     24
     25                                   ;DELAY EXECUTION OF PROGRAM A SPECIFIED NUMBER OF 100-MICROSECOND TIME COUNTS
     26                                   ;USING A KW11-P PROGRAMMABLE CLOCK OR A LINE CLOCK. THE TIME DELAY IS INVALID
     27                                   ;IF TOO LARGE AN ARGUMENT IS USED WITH THE LINE CLOCK.
     62
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                                .SBTTL  GLOBAL DATA AND CONSTANTS

002224                          BGNMOD  GLBDAT

                                ;       TABLE OF OPERATION MESSAGES
002224  000000                  OPMSGS: .WORD   0               ;FILLER
002226  005271                          .WORD   MWRCHK          ;MESSAGE FOR WRITE CHECK
002230  005315                          .WORD   MGTSTA          ;            GET STATUS
002232  005242                          .WORD   MSEEK           ;            SEEK
002234  005261                          .WORD   MREADH          ;            READ HEADER
002236  005303                          .WORD   MWRITE          ;            WRITE DATA
002240  005250                          .WORD   MREAD           ;            READ DATA
002242  005400                          .WORD   MWRSET          ;            WITH RESET
002244  005327                          .WORD   MDATCP          ;            WITH DATA COMPARE
002246  005346                          .WORD   MHDRCP          ;            WITH HEADER COMPARE
002250  005445                          .WORD   MCYLUP          ;            LOAD HEADS
002252  005434                          .WORD   MULOAD          ;            UNLOAD HEADS
002254  005476                          .WORD   MINOUT          ;               IN-OUT SEQ
002256  005455                          .WORD   MOUTIN          ;               OUT-IN SEQ
002260  005521                          .WORD   MFOLWRT         ;               FOLLOWING WRITE
002262  005543                          .WORD   MREVSK          ;               REV SEEK
002264  005576                          .WORD   MFWDSK          ;               FWD SEEK
002266  005665                          .WORD   MRESKO          ;               REV SEEK
002270  005631                          .WORD   MFWSKO          ;               FWD SEEK
002272  005721                          .WORD   MBADAD          ;               BAD DISK ADD FOR WRITE
002274  005364                          .WORD   M40HDR          ;            40 HEADER OPERATION
002276  000000                  T.DRIVE: .WORD  0
002300  000000                  JJJ:    .WORD   0
002302  000000                  HLMTW:  .WORD   0
002304  000000                  CLRBYT: .WORD   0
002306  000000                  NXTHL:  .WORD   0
002310  000000                  GBND:   .WORD   0
002312  000000                  CAMSK:  .WORD   0
002314  000000                  DIRMSK: .WORD   0
002316  000000                  HDCYL:  .WORD   0


                                ;       TABLE OF RESULT NAME MESSAGE ADDRESSES
002320  010415                  RESTBL: .WORD   MCERR           ;CONTROLLER ERROR
002322  010526                          .WORD   MDRERR          ;DRIVE ERROR
002324  011041                          .WORD   MNEERR          ;NON-EXISTENT MEMORY ERROR
002326  011013                          .WORD   MFLERR          ;HEADER NOT FOUND-DATA LATE
002330  010776                          .WORD   MHDERR          ;HEADER OR DATA ERROR
002332  010766                          .WORD   MOPERR          ;OPERATION INCOMPLETE
002334  011057                          .WORD   MNDRST          ;NO DRIVE STATUS AVAILABLE
002336  000000                          .WORD   0
002340  010751                          .WORD   MWDERR          ;WRITE DATA ERROR
002342  010733                          .WORD   MHCERR          ;HEAD CURRENT ERROR
002344  000000                          .WORD   0
002346  010715                          .WORD   MSTERR          ;SEEK TIMEOUT ERROR
002350  010662                          .WORD   MSPERR          ;SPINDLE ERROR
002352  010700                          .WORD   MWGERR          ;WRITE GATE ERROR
002354  000000                          .WORD   0
002356  010632                          .WORD   MDSERR          ;DRIVE SELECT ERROR
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                                        ;       PATTERN TABLE
002360  004764                          PATTBL: .WORD   PAT1
002362  004766                                  .WORD   PAT2
002364  005026                                  .WORD   PAT3
002366  005066                                  .WORD   PAT4
002370  005126                                  .WORD   PAT5
002372  005134                                  .WORD   PAT6
002374  005174                                  .WORD   PAT7
002376  005176                                  .WORD   PAT8
002400  005236                                  .WORD   PAT9
002402  005240                                  .WORD   PAT10



                                        ;       SUBROUTINE CALLING STACK
002404  000000                          SUBSTK: .WORD   0               ;STACK IS 12 WORDS LONG
002406  000000                                  .WORD   0
002410  000000                                  .WORD   0
002412  000000                                  .WORD   0
002414  000000                                  .WORD   0
002416  000000                                  .WORD   0
002420  000000                                  .WORD   0
002422  000000                                  .WORD   0
002424  000000                                  .WORD   0
002426  000000                                  .WORD   0

                                        ;RL01 TABLE OF CYLINDERS
002430  000002                          T25TBL: .WORD   2               ;TABLE OF DIFFERENCES
002432  000006                                  .WORD   6
002434  000011                                  .WORD   9.
002436  000014                                  .WORD   12.
002440  000021                                  .WORD   17.
002442  000026                                  .WORD   22.
002444  000033                                  .WORD   27.
002446  000042                                  .WORD   34.
002450  000051                                  .WORD   41.
002452  000200                                  .WORD   128.
002454  000377                                  .WORD   255.

                                        ;RL02 TABLE OF CYLINDERS
002456  000004                          T25TB2: .WORD   4
002460  000014                                  .WORD   12.
002462  000022                                  .WORD   18.
002464  000030                                  .WORD   24.
002466  000042                                  .WORD   34.
002470  000054                                  .WORD   44.
002472  000066                                  .WORD   54.
002474  000104                                  .WORD   68.
002476  000122                                  .WORD   82.
002500  000400                                  .WORD   256.
002502  000777                                  .WORD   511.

                                        ;       TABLE TO BE USED TO BUILD AND STORE THE CYLINDERS

002504                                  T33TBL: .BLKW   16.
002544                                  TBT:    .BLKW   16.

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002604  002          CYLTBL: .BYTE   2           ;TABLE OF DEFAULT CYLINDERS
002605  007                  .BYTE   7.
002606  016                  .BYTE   14.
002607  024                  .BYTE   20.
002610  033                  .BYTE   27.
002611  041                  .BYTE   33.
002612  046                  .BYTE   38.
002613  055                  .BYTE   45.
002614  064                  .BYTE   52.
002615  072                  .BYTE   58.
002616  101                  .BYTE   65.
002617  110                  .BYTE   72.
002620  115                  .BYTE   77.
002621  124                  .BYTE   84.
002622  133                  .BYTE   91.
002623  141                  .BYTE   97.
002624  146                  .BYTE   102.
002625  154                  .BYTE   108.
002626  161                  .BYTE   113.
002627  170                  .BYTE   120.
002630  177                  .BYTE   127.
002631  206                  .BYTE   134.
002632  213                  .BYTE   139.
002633  222                  .BYTE   146.
002634  230                  .BYTE   152.
002635  235                  .BYTE   157.
002636  244                  .BYTE   164.
002637  252                  .BYTE   170.
002640  261                  .BYTE   177.
002641  270                  .BYTE   184.
002642  275                  .BYTE   189.
002643  303                  .BYTE   195.
002644  312                  .BYTE   202.
002645  317                  .BYTE   207.
002646  326                  .BYTE   214.
002647  334                  .BYTE   220.
002650  343                  .BYTE   227.
002651  352                  .BYTE   234.
002652  361                  .BYTE   241.
002653  367                  .BYTE   247.
002654  375                  .BYTE   253.
002655  000                  .BYTE   0
002656  000401               .WORD   257.
002660  000406               .WORD   262.
002662  000415               .WORD   269.
002664  000423               .WORD   275.
002666  000432               .WORD   282.
002670  000445               .WORD   293.
002672  000454               .WORD   300.
002674  000463               .WORD   307.
002676  000471               .WORD   313.
002700  000500               .WORD   320.
002702  000507               .WORD   327.
002704  000514               .WORD   332.
002706  000523               .WORD   339.
002710  000532               .WORD   346.
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002712  000540          .WORD   352.
002714  000545          .WORD   357.
002716  000553          .WORD   363.
002720  000560          .WORD   368.
002722  000567          .WORD   375.
002724  000576          .WORD   382.
002726  000605          .WORD   389.
002730  000612          .WORD   394.
002732  000621          .WORD   401.
002734  000627          .WORD   407.
002736  000634          .WORD   412.
002740  000643          .WORD   419.
002742  000651          .WORD   425.
002744  000660          .WORD   432.
002746  000667          .WORD   439.
002750  000674          .WORD   444.
002752  000702          .WORD   450.
002754  000711          .WORD   457.
002756  000716          .WORD   462.
002760  000725          .WORD   469.
002762  000733          .WORD   475.
002764  000742          .WORD   482.
002766  000751          .WORD   489.
002770  000760          .WORD   496.
002772  000766          .WORD   502.
002774  000774          .WORD   508.
002776  000774          .WORD   508.
003000  000000          .WORD   0
003002  000000  SSINDX: .WORD   0               ;SUBROUTINE STACK INDEX POINTER

                ;       OPERATIONAL FLAGS
003004  000000  OPFLAG: .WORD   0               ;OPERATION FLAGS
003006  000000  DONE:   .WORD   0               ;OPERATION COMPLETE FLAG
003010  000000  HADONE: .WORD   0               ;HEAD ALIGNMENT DONE FLAG
003012  000000  ERHEAD: .WORD   0               ;ADDRESS OF ERROR HEADER
003014  000000  MORECE: .WORD   0               ;MORE THAN 1 COMPARE ERROR
003016  000000  ERRSWI: .WORD   0               ;ERROR RETURN SWITCH
003020  000000  BSFLAG: .WORD   0               ;BAD SECTOR FLAGS
003022  000000  WRTSWI: .WORD   0               ;WRITE SWITCH
003024  000000  TBLSTR: .WORD   0               ;TABLE STORAGE

003026  000000  RLBAS:  .WORD   0               ;RL11 BASE ADDRESS
003030  000000  RLVEC:  .WORD   0               ;RL11 VECTOR ADDRESS
003032  000000  RLDRV:  .WORD   0               ;DRIVE NUMBER UNDER TEST

003034  000000  L.CS:   .WORD   0               ;CONTROLLER REGISTER STORAGE
003036  000000  L.BA:   .WORD   0               ;BEFORE OPERATION
003040  000000  L.DA:   .WORD   0
003042  000000  L.MP:   .WORD   0
003044  000000  T.CS:   .WORD   0               ;CONTROLLER REGISTER STORAGE
003046  000000  T.BA:   .WORD   0               ;    AFTER OPERATION
003050  000000  T.DA:   .WORD   0
003052          T.MP:
003052  000000  HDWRD1: .WORD   0               ;HEADER WORD STORAGE
003054  000000  HDWRD2: .WORD   0
003056  000000  HDWRD3: .WORD   0
```

```
172 003060  000000          T.STAT: .WORD   0               ;DRIVE STATE STORAGE
173
174 003062  000000          RESPARM: .WORD  0               ;PARAM BLOCK FOR REASON REPORT
175 003064  000000                  .WORD   0
176 003066  000000                  .WORD   0
177 003070  000000                  .WORD   0
178 003072  000000                  .WORD   0
179
180 003074  000000          DRVCNT: .WORD   0               ;DRIVE COUNT FOR DRIVES UNDER TEST
181 003076  000000          DIFAUG: .WORD   0               ;DIFFERENCE ARGUMENT FOR SEEK
182 003100  000000          OLDCYL: .WORD   0               ;OLD CYLINDER
183 003102  000000          NEWCYL: .WORD   0               ;NEW CYLINDER
184 003104  000000          CURCYL: .WORD   0               ;CURRENT CYLINDER
185 003106  000000          DESDIF: .WORD   0               ;DESIRED DIFFERENCE
186 003110  000000          DESSGN: .WORD   0               ;DESIRED SIGN
187 003112  000000          DESHD:  .WORD   0               ;DESIRED HEAD
188 003114  000000          DESSEC: .WORD   0               ;DESIRED SECTOR
189 003116  000000          TEMP0:  .WORD   0               ;TEMPORARY STORAGE
190 003120  000000          TEMP1:  .WORD   0               ;TEMPORARY STARAGE
191 003122  000000          TEMP2:  .WORD   0               ;TEMPORARY STORAGE
192 003124  000000          TEMP3:  .WORD   0               ;TEMPORARY STORAGE
193 003126  000000          TEMP4:  .WORD   0               ;TEMPORARY STORAGE
194 003130  000000          TEMP5:  .WORD   0               ;TEMPORARY STORAGE
195 003132  000000          TEMP6:  .WORD   0               ;TEMPORARY STORAGE
196 003134  000000          TEMP7:  .WORD   0               ;TEMPORARY STORAGE
197 003136  000000          TEMP8:  .WORD   0               ;TEMPORARY STORAGE
230 003140  000004          ERRVEC: .WORD   4               ;ERROR VECTOR
231 003142  000000          DLYCNT: .WORD   0               ;DELAY COUNTER USED IN TIMING MACROS
232 003144  000000          CLKFLG: .WORD   0               ;FLAG INDICATING PRESENCE OF A L OR P CLOCK
233 003146  000000          CLKADR: .WORD   0               ;POINTER TO DIAGNOSTIC MONITOR CLOCK TABLE
234 003150  000000          LBASE:  .WORD   0               ;L CLOCK ITERATION NUMBER TO FAKE P CLOCK
235
236                         ;       MISCELLANEOUS COUNTERS
237 003152  000000          PASCNT: .WORD   0               ;PASS COUNTER (LOCAL TO A TEST)
238 003154  000000          COUNT:  .WORD   0               ;A COUNTER (LOCAL TO A TEST)
239 003156  000000          ERRPOINT: .WORD 0               ;ERROR POINTER
240 003160                  ERRCNT: .BLKW   64.             ;ERROR COUNTER FOR PROGRAM
241 003360  000000          PASNUM: .WORD   0               ;PASS NUMBER FOR PROGRAM
242 003362  000000          PSETNM: .WORD   0               ;COUNTER FOR PARAMETER SET NUMBER IN USE
243 003364     000          LOCERR: .BYTE   0               ;LOCAL ERROR COUNTER
244 003365     000          NOERCT: .BYTE   0               ;INHIBIT ERROR COUNTING FLAG
245 003366  000000          TRPFLG: .WORD   0               ;HARDWARE TRAP FLAG
246 003370  000000          PWRFLG: .WORD   0               ;POWER FAILURE FLAG
247
248                         ;       BAD SECTOR TABLES AND POINTERS
249 003372  000000          BSFVAL: .WORD   0               ;BAD SECTORS FILES VALID FLAG
250
251 003374                  SBSFIL: .BLKW   76              ;SOFTWARE BAD SECTOR FILE
252 003570                  FBSFIL: .BLKW   76              ;FACTORY BAD SECTOR FILE
253
254 003764                  IBUFF:  .BLKW   200             ;INPUT BUFFER
255 004364                  OBUFF:  .BLKW   200             ;OUTPUT BUFFER
256
257 004764  000000          PAT1:   .WORD   0               ;PATTERN 1 (ALL ZEROS)
258 004766  177772          PAT2:   .WORD   177772
259 004770  177777                  .WORD   177777
260 004772  177777                  .WORD   177777
```

```
004774  052525                          .WORD   052525
004776  052525                          .WORD   052525
005000  052525                          .WORD   052525
005002  177777                          .WORD   177777
005004  177777                          .WORD   177777
005006  052525                          .WORD   052525
005010  052525                          .WORD   052525
005012  177777                          .WORD   177777
005014  052525                          .WORD   052525
005016  177252                          .WORD   177252
005020  177252                          .WORD   177252
005022  172765                          .WORD   172765
005024  172765                          .WORD   172765

005026  000003                  PAT3:   .WORD   000003
005030  000000                          .WORD   000000
005032  000000                          .WORD   000000
005034  177777                          .WORD   177777
005036  177777                          .WORD   177777
005040  177777                          .WORD   177777
005042  000000                          .WORD   000000
005044  000000                          .WORD   000000
005046  177777                          .WORD   177777
005050  177777                          .WORD   177777
005052  000000                          .WORD   000000
005054  177777                          .WORD   177777
005056  000000                          .WORD   000000
005060  177777                          .WORD   177777
005062  000000                          .WORD   000000
005064  177777                          .WORD   177777

005066  025252                  PAT4:   .WORD   025252
005070  052525                          .WORD   052525
005072  052525                          .WORD   052525
005074  125252                          .WORD   125252
005076  125252                          .WORD   125252
005100  125252                          .WORD   125252
005102  052525                          .WORD   052525
005104  052525                          .WORD   052525
005106  125252                          .WORD   125252
005110  125252                          .WORD   125252
005112  052525                          .WORD   052525
005114  125252                          .WORD   125252
005116  052525                          .WORD   052525
005120  125252                          .WORD   125252
005122  052525                          .WORD   052525
005124  125252                          .WORD   125252

005126  155555                  PAT5:   .WORD   155555
005130  133333                          .WORD   133333
005132  066666                          .WORD   066666

005134  121105                  PAT6:   .WORD   121105
005136  150442                          .WORD   150442
005140  064221                          .WORD   064221
005142  132110                          .WORD   132110
005144  055044                          .WORD   055044
```

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005146  026442                          .WORD   026442
005150  013211                          .WORD   013211
005152  105504                          .WORD   105504
005154  042642                          .WORD   042642
005156  021321                          .WORD   021321
005160  110550                          .WORD   110550
005162  044264                          .WORD   044264
005164  022132                          .WORD   022132
005166  011055                          .WORD   011055
005170  104426                          .WORD   104426
005172  042213                          .WORD   042213

005174  177777                  PAT7:   .WORD   177777

005176  045513                  PAT8:   .WORD   045513
005200  122645                          .WORD   122645
005202  151322                          .WORD   151322
005204  064551                          .WORD   064551
005206  132264                          .WORD   132264
005210  055132                          .WORD   055132
005212  026455                          .WORD   026455
005214  113226                          .WORD   113226
005216  045513                          .WORD   045513
005220  122645                          .WORD   122645
005222  151322                          .WORD   151322
005224  064551                          .WORD   064551
005226  132264                          .WORD   132264
005230  055132                          .WORD   055132
005232  026455                          .WORD   026455
005234  113226                          .WORD   113226

005236  125252                  PAT9:   .WORD   125252

005240  155555                  PAT10:  .WORD   155555

005242                          ENDMOD



                                .SBTTL  GLOBAL MESSAGES

005242                          BGNMOD  GLBTXT
005242     123     105     105  MSEEK:  .ASCIZ  /SEEK /
005250     122     104     040  MREAD:  .ASCIZ  /RD DATA /
005261     122     104     040  MREADH: .ASCIZ  /RD HDR /
005271     127     122     124  MWRCHK: .ASCIZ  /WRT CHECK/
005303     127     122     124  MWRITE: .ASCIZ  /WRT DATA /
005315     107     105     124  MGTSTA: .ASCIZ  /GET STAT /
005327     127     111     124  MDATCP: .ASCIZ  /WITH DATA CMP /
005346     127     111     124  MHDRCP: .ASCIZ  /WITH HDR CMP /
005364     106     117     122  M40HDR: .ASCIZ  /FOR 40 HDRS/
005400     127     111     124  MWRSET: .ASCIZ  /WITH RESET /
005414     117     120     105  MOPER:  .ASCIZ  /OPER: /
005423     122     105     123  MRSLT:  .ASCIZ  /RESULT:        /
005434     125     116     114  MULOAD: .ASCIZ  /UNLD DRV/
005445     114     104     040  MCYLUP: .ASCIZ  /LD DRV /
005455     106     117     114  MOUTIN: .ASCIZ  /FOL 0 TO CC SEEK/
005476     106     117     114  MINOUT: .ASCIZ  /FOL 255 TO CC SEEK/
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    378 005521     106     117     114  MFOLWRT: .ASCIZ /FOL WRT (NO SEEK)/
    379 005543     101     104     112  MREVSK:  .ASCIZ  /ADJ CYL WRTTN AFTER REV SK/
    380 005576     101     104     112  MFWDSK:  .ASCIZ  /ADJ CYL WRTTN AFTER FWD SK/
    381 005631     123     113     040  MFWSKO:  .ASCIZ  /SK FWD,WRT - SK REV,OVERWRT/
    382 005665     123     113     040  MRESKO:  .ASCIZ  /SK REV,WRT - SK FWD,OVERWRT/
    383 005721     117     116     040  MBADAD:  .ASCIZ  /ON BAD SEC FILES/
    384 005742     103     101     116  MBADSF:  .ASCIZ  /CANNOT GET BAD SEC FILES/
    385 005773     102     101     104  MFMTER:  .ASCIZ  /BAD SEC FILE FMT ERR/
    386 006020     124     117     117  MTMBS:   .ASCIZ  /TOO MANY BAD SEC /
    387 006042     102     125     123  BASADD:  .ASCIZ  /BUS ADD=/
    388 006053     104     122     126  DRVNAM:  .ASCIZ  /DRV=/
    389 006060     104     122     126  NOPWR:   .ASCIZ  /DRV DID NOT REC'R FROM PWR FAIL/
    390 006120     122     114     103  CSNAM:   .ASCIZ  /RLCS/
    391 006125     122     114     102  BANAM:   .ASCIZ  /RLBA/
    392 006132     122     114     104  DANAM:   .ASCIZ  /RLDA/
    393 006137     122     114     115  MPNAM:   .ASCIZ  /RLMP/
    394 006144     117     120     040  LAB1:    .ASCIZ  /OP INIT = /
    395 006157     117     120     040  LAB2:    .ASCIZ  /OP DONE = /
    396 006172     127     117     122  MWORD:   .ASCIZ  /WORD /
    397 006200     111     116     124  MTOSLOW: .ASCIZ /INTRPT TOO LATE/
    398 006220     116     117     040  MDRRES:  .ASCIZ  /NO DRV RESPONSE/
    399 006240     116     117     040  MNOINT:  .ASCIZ  /NO INTRPT ON CMND COMPLETE/
    400 006273     103     116     124  MCONHNG: .ASCIZ /CNTLR HUNG /
    401 006307     105     122     122  MNOCLR:  .ASCIZ  /ERR DID NOT CLR/
    402 006327     126     117     114  VCNRST:  .ASCIZ  /VOL CHK NOT RSET/
    403 006350     125     116     130  UNXERR:  .ASCIZ  /UNXPCTED ERR/
    404 006365     040     124     105  TSTLAB:  .ASCIZ  / TEST/
    406 006373     115     101     116  MISTST:  .ASCIZ  /MAN INTERVENT STAT/
    407 006416     123     124     101  NSTACHG: .ASCIZ /STATE CHG/
    408 006430     123     120     116  SPDERR:  .ASCIZ  /SPNDL TIMEOUT FAILED TO SET/
    409 006464     106     101     111  GSTER1:  .ASCIZ  /FAIL FORCING DRV SEL ERR/
    410 006515     111     116     111  INITST:  .ASCIZ  /INIT STATE/
    411 006530     104     122     126  T05ERR:  .ASCIZ  /DRV SELECT/
    412 006543     104     122     126  T09ERR:  .ASCIZ  /DRV RDY/
    413 006553     123     105     105  T10ERR:  .ASCIZ  /SEEK SGN SWITCH/
    414 006573     110     104     040  T12ERR:  .ASCIZ  /HD SWITCH/
    415 006605     122     104     040  T13ERR:  .ASCIZ  /RD HDR (P1)/
    416 006621     122     104     040  T14ERR:  .ASCIZ  /RD HDR (P2)/
    417 006635     127     122     124  T16ERR:  .ASCIZ  /WRT LCK/
    418 006645                          P2T01E:
    419 006645     104     111     106  P2T02E:  .ASCIZ  /DIFF OF 1 SEEK/
    420 006664     124     105     123  NOTST:   .ASCIZ  /TEST CANNOT BE PERFORMED...NO P CLOCK OR SOFTWARE CLOCK/
    421 006754     104     122     126  NOCTLR:  .ASCIZ  /DRV DROPPED - NO CNTLR/
    422 007003     104     122     126  NOTRDY:  .ASCIZ  /DRV DROPPED - NOT RDY/
```

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     8 007031     110     104     123  HDMOVF: .ASCIZ  /HDS FAILED TO MOVE IN 10 TRIES/
    10 007070     103     131     114  CYLPER: .ASCIZ  /CYL PORTION OF HDRS DIFFER WHEN READ FROM TRK 0 & 1/
    11 007154     110     105     101  HAMES1: .ASCIZ  /HEAD ALIGN. RSET WRT LCK TO SEL HD 0, SET FOR HD 1/
    12 007237     124     131     120  HAMES2: .ASCIZ  &TYPE "CTL/C" TO GET BACK TO SUPVR CMD MODE AND THEN TYPE "CONT"    &
    13 007343     111     106     040  HAMES3: .ASCIZ  /IF HD SEL TP (21, 22) DO NOT EXIST/
    14 007406     107     116     104  HAMES4: .ASCIZ  /GND NULL DET ON DRV LGC MOD DISABLE SEEK TIME OUT/
    15 007470     101     102     117  OPR002: .ASCIZ  /ABOVE CONDITIONS MET/
    16 007515     127     101     123  OPR003: .ASCIZ  /WAS LOAD DEPRESSED/
    17 007540     103     110     113  OPR1:   .ASCIZ  /CHK DRV IS UNLDED, COVER OPN, AND WRTE LCKED /
    18 007616     103     114     117  OPR2:   .ASCIZ  /CLOSE COVER & RST WRT LCK /
    19 007651     120     122     105  OPR3:   .ASCIZ  /PRESS LOAD /
    20 007665     120     122     105  OPR6:   .ASCIZ  /PRESS LOAD & WAIT FOR RDY /
    21 007720     122     105     115  OPR7:   .ASCIZ  /REMOVE ADR PLGS EXCPT /
    22 007747     111     116     123  OPR8:   .ASCIZ  /INSRT ADR PLG /
    23 007766     111     116     040  OPR9:   .ASCIZ  /IN ALL DRVS /
    24 010003     111     116     123  OPR10:  .ASCIZ  /INSUFFICIENT DRVS FOR DRV SEL ERR TST/
    25 010051     122     120     114  OPR11:  .ASCIZ  /RPLCE ADR PLGS AS BEFORE/
    27 010102     122     105     123  OPR12:  .ASCIZ  /RESET WRT LCK /
    28 010121     123     105     124  OPR12A: .ASCIZ  /SET WRT LCK/
    29 010135     117     116     040  OPR1A:  .ASCIZ  /ON /
    30 010141     117     116     040  OPR1B:  .ASCIZ  /ON DRV /
    31 010151     125     116     104  UNDTST: .ASCIZ  /UNDER TEST/
    32 010164     123     105     124  OPR004: .ASCIZ  /SET WRT LCK /
    33 010201     104     111     106  DIFWD:  .ASCIZ  /DIFF /
    34 010207     123     107     116  SGNWD:  .ASCIZ  /SGN /
    35 010214     110     104     040  HDWD:   .ASCIZ  /HD /
    36 010220     123     105     103  SECWD:  .ASCIZ  /SEC /
    37 010225     103     131     114  CYLWD:  .ASCIZ  /CYL /
    38 010232     106     122     117  FRMWD:  .ASCIZ  /FROM /
    39 010240     040     102     131  BYPSNM: .ASCIZ  / BYPASSED /
    40 010253     122     117     125  SEQMES: .ASCIZ  /ROUTINE TRACE SEQ:/
    41 010276     104     122     126  STAMES: .ASCIZ  /DRV STAT/
    42 010307     102     101     104  BSNSTR: .ASCIZ  /BAD SEC FILES NOT STRD. ALL SEC ASSUMED OK./
    43 010363     124     117     124  TCERR:  .ASCIZ  /TOTAL CMP ERRS: /
    44
    45                                 ;            RESULT NAMES
    46 010404     104     122     126  MDRDY:  .ASCIZ  /DRV RDY /
    47 010415     103     117     116  MCERR:  .ASCIZ  /CONT ERR /
    48 010427     110     104     122  MHCRC:  .ASCIZ  /HDR CRC/
    49 010437     104     101     124  MDCRC:  .ASCIZ  /DATA CRC/
    50 010450     110     104     122  MHNF:   .ASCIZ  /HDR NOT FND/
    51 010464     104     101     124  MDLT:   .ASCIZ  /DATA LATE/
    52 010476     110     104     122  MHFCRC: .ASCIZ  &HDR NOT FND/HDR CRC/OPI&
    53 010526     104     122     126  MDRERR: .ASCIZ  /DRV ERR /
    55 010537     123     105     114  MHSTA:  .ASCIZ  /SEL'D HD /
    56 010551     126     117     114  MVOLCK: .ASCIZ  /VOL CHK /
    57 010562     103     117     126  MCOSTA: .ASCIZ  /COVER OPEN/
    58 010575     102     122     125  MBHSTA: .ASCIZ  /BRUSH HOME/
    59 010610     127     122     124  MWLSTA: .ASCIZ  /WRT LCK /
    60 010621     110     104     123  MHOSTA: .ASCIZ  /HDS OUT /
    62 010632     104     122     126  MDSERR: .ASCIZ  /DRV SEL ERR /
    63 010647     104     122     126  MDRVST: .ASCIZ  /DRV STATE /
    64 010662     123     120     111  MSPERR: .ASCIZ  /SPIN TIMEOUT /
    65 010700     127     122     124  MWGERR: .ASCIZ  /WRT GAT ERR /
    66 010715     123     105     105  MSTERR: .ASCIZ  /SEEK TIMEOUT /
    67 010733     110     105     101  MHCERR: .ASCIZ  /HEAD CUR ERR /
    68 010751     127     122     124  MWDERR: .ASCIZ  /WRT DAT ERR /
```

```
 011003    117     120     122  MOPERR: .ASCIZ  /OPR-INC/
 010776    110     104     122  MHDERR: .ASCIZ  &HDR/DAT ERR &
 011013    110     104     122  MFLERR: .ASCIZ  &HDR NOT FND/DAT LATE &
 011041    116     055     130  MNEERR: .ASCIZ  /N-X-MEM /
 011052    103     131     114  MCYLOC: .ASCIZ  /CYL /
 011057    103     101     116  MNDRST: .ASCIZ  /CANNOT GET DRV STAT/
 011103    125     116     113  MUNDEF: .ASCIZ  /UNKN DRV STATE-NO RDY,NO ERR,HDS OUT/
 011150    106     101     111  MRLFAL: .ASCIZ  /FAIL TO RELD HDS AFTER ERR CLEAR/
 011211    127     122     124  MWRTAB: .ASCIZ  /WRT ABORTED/
 011225    040     117     126  MEXERS: .ASCIZ  / OVER ERR LIMIT - UNIT DROPPED /
 011265    040     105     122  MERRS:  .ASCIZ  / ERROR/
 011274    207     377     377  BELL:   .ASCIZ  <207><377><377>

                                ;       RESULT SETTINGS
 011300    111     123     040  RESE3:  .ASCIZ  /IS /
 011304    040     123     102  RESE4:  .ASCIZ  / SB /

                                ;       RESULT CONDITIONS
 011311    040     111     116  RESE5:  .ASCIZ  / IN /
 011316    040     117     106  RESE6:  .ASCIZ  / OF /
 011323    123     124     101  STATE2: .ASCIZ  /STATE 2/
 011333    123     124     101  STATE3: .ASCIZ  /STATE 3/
 011343    123     124     101  STATE5: .ASCIZ  /STATE 5/
 011353    123     105     105  CDRDY:  .ASCIZ  &SEEK W/O MOTION&
 011373    061     123     124  C10MS:  .ASCIZ  /1ST 3 MS/
 011404    065     060     060  C500MS: .ASCIZ  /500MS/
 011412    103     131     103  CCYLUP: .ASCIZ  /CYCLE UP/
 011423    104     101     124  CAFDT:  .ASCIZ  /DATA XFR/
 011434    065     040     123  C5SEC:  .ASCIZ  /5 SEC/

 011442    045     116     045  FMTOP1: .ASCIZ  /%N%T%N%T%T%06%S%T%01%N/
 011471    045     116     045  FMTOP2: .ASCIZ  /%N%T%01%S1%T%01%N/
 011513    045     116     045  FMTOP3: .ASCIZ  /%N%T%01%S1%T%T%N/
 011534    045     124     045  FMT1:   .ASCIZ  /%T%T/
 011541    045     116     045  FMT1.1: .ASCIZ  /%N%T%T/
 011550    045     124     000  FMT2:   .ASCIZ  /%T/
 011553    045     116     000  FMT3:   .ASCIZ  /%N/
 011556    045     116     045  FMT4:   .ASCIZ  /%N%T%T%N/
 011567    045     116     045  FMT5:   .ASCIZ  /%N%T%06%S1%T%01/
 011607    045     116     045  FMT6:   .ASCIZ  /%N%S11%T%S4%T%S4%T%S4%T%S4%T%S2%T/
 011651    045     116     045  FMT7:   .ASCIZ  /%N%T%06%S2%06%S2%06%S2%06%S3%03%S2%01%N/
 011721    045     116     045  FMT8:   .ASCIZ  /%N%T%06%S2%06%S2%06%S2%06/
 011753    045     116     045  FMT9:   .ASCIZ  /%N%T/
 011760    045     124     045  FMT11:  .ASCIZ  /%T%01/
 011766    045     124     045  FMT12:  .ASCIZ  /%T%03/
 011774    045     116     045  FMT13:  .ASCIZ  /%N%S11%T%03%S1%T%03%S1%T%01%S1%T%01/
 012040    045     116     045  FMT14:  .ASCIZ  /%N%T%T%D3%S1%T%06%S1%T%06/
 012072    045     116     045  FMT15:  .ASCIZ  /%N%S11%T%D3%S1%T%06%S1%T%06/
 012126    045     116     045  FMT16:  .ASCIZ  /%N%S5%06/
 012137    045     123     061  FMT17:  .ASCIZ  /%S10%T%N%S11%06%N/
 012161    045     116     045  FMT18:  .ASCIZ  /%N%S15%T%S5%T%S4%T%S5%T%N/
 012213    045     124     045  FMT19:  .ASCIZ  /%T%S4%D6%S4%D6%S4%D6%S4%D6%N/
 012250    045     124     045  FMT20:  .ASCIZ  /%T%S2%D6%S14%D6%S4%D6%N/
 012300    045     124     045  FMT21:  .ASCIZ  /%T%S12%D6%S14%D6%N/
 012323    045     116     045  FMT22:  .ASCIZ  /%N%S11%T%03%S1%T%01%S1%T%02/
 012357    045     124     045  FMT23:  .ASCIZ  /%T%T%T%01%N/
 012373    045     116     045  FMT24:  .ASCIZ  /%N%T/
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012400      045      116      045  FMT25:  .ASCIZ  /%N%D2%T/
012410      045      116      045  FMT26:  .ASCIZ  /%N%S1%T%D4%T%T%D3%N/
012434      045      116      045  FMT27:  .ASCIZ  /%N%T%D3%T%D3%N/
012453      045      116      045  FMT28:  .ASCIZ  /%N%T%T%T/
012464                             ENDMOD


                                   .SBTTL  ERROR MESSAGES

012464                             BGNMOD  GLBERR
                                   ;       ERR1    R3 POINTS TO RESULT MESSAGE
                                   ;               RESULT: (R3)

                                   ;       ERR2    R3 POINTS TO RESULT NAME
                                   ;               RESULT: (R3) IS 1 SB 0

                                   ;       ERR3    R3 POINTS TO RESULT NAME
                                   ;               RESULT: (R3) IS 0 SB 1

                                   ;       ERR4    R3 POINTS TO RESULT NAME
                                   ;               R4 POINTS TO RESULT CONDITIONS
                                   ;               RESULT: (R3) IS 1 SB 0 (R4)

                                   ;       ERR5    R3 POINTS TO RESULT NAME
                                   ;               R4 POINTS TO RESULT CONDITIONS
                                   ;               RESULT: (R3) IS 0 SB 1 (R4)

                                   ;       ERR6    RESULT ROUTINE DETERMINES WHICH ERROR(S) ARE SET AND
                                   ;               REPORTS ALL
                                   ;               RESULT: "ERROR" IS 1 SB 0

                                   ;       ERR7    DRIVE STATE ERROR REPORT
                                   ;               R3 CONTAINS EXPECTED STATE
                                   ;               T.STAT CONTAINS BAD STATE
                                   ;               RESULT: DRIVE STATE IS (T.STAT) SB (R3)

                                   ;       ERR8    HEAD POSITIONING ERROR REPORT
                                   ;               NEWCYL CONTAINS EXPECTED CYLINDER
                                   ;               HDWRD1 CONTAINS BAD CYLINDER
                                   ;               RESULT: CYLINDER IS (HDWRD1) SB (NEWCYL)

                                   ;       ERR9    UTILITY RESULT REPORT
                                   ;               R3 POINTS TO RESULT NAME
                                   ;               R4 POINTS TO VALUE 1
                                   ;               R5 POINTS TO VALUE 2
                                   ;               RESULT: (R3-NAME) IS (R4-VALUE 1) SB (R5-VALUE 2)

                                   ;       ERR10   COMPARE ERROR REPORT
                                   ;               R3 CONTAINS THE BAD WORD NUMBER
                                   ;               R4 POINTS TO BAD WORD
                                   ;               R5 POINTS TO GOOD WORD
                                   ;               RESULT: WORD (R3) IS (R4) SB (R5)


                                   .NLIST  MD,ME


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```
012464                          BGNMSG  ERR1
012464  105767  170675                  TSTB    NOERCT          ;TEST IF ERROR COUNTING INHIBITED
012470  001002                          BNE     1$              ;YES - SKIP
012472  005277  170460                  INC     @ERRPOINT       ;ELSE BUMP ERROR COUNT
012476  010146                  1$:     MOV     R1,-(SP)        ;STORE R1
012500  004767  011212                  JSR     PC,RPTOP        ;REPORT OPERATION
012504  012721  000001                  MOV     #1,(R1)+        ;SET PARAM NUMBER
012510  010321                          MOV     R3,(R1)+        ;INSERT MESSAGE ADDRESS POINTER
012512  004767  011766                  JSR     PC,RPTRES       ;REPORT RESULTS
012516  004767  012170                  JSR     PC,RPTREM       ;REPORT REMAINDER
012522  012601                          MOV     (SP)+,R1        ;RESTORE R1
012524  004767  003714                  JSR     PC,CKERLM       ;GO CHECK IF ERROR COUNT EXCEEDED
012530                          ENDMSG
012530                          L10000:
012530  104423                          TRAP    C$MSG

012532                          BGNMSG  ERR2
012532  005277  170420                  INC     @ERRPOINT       ;BUMP ERROR COUNT
012536  010146                          MOV     R1,-(SP)        ;STORE R1
012540  004767  011152                  JSR     PC,RPTOP        ;REPORT OPERATION
012544  012721  000003                  MOV     #3,(R1)+        ;SET PARAM NUMBER
012550  010321                          MOV     R3,(R1)+        ;INSERT NAME ADD POINTER
012552  012721  000001                  MOV     #1,(R1)+        ;SET IS VALUE
012556  005021                          CLR     (R1)+           ;SET SB VALUE
012560  004767  011720                  JSR     PC,RPTRES       ;REPORT RESULTS
012564  004767  012122                  JSR     PC,RPTREM       ;REPORT REMAINDER
012570  012601                          MOV     (SP)+,R1        ;RESTORE R1
012572  004767  003646                  JSR     PC,CKERLM       ;GO CHECK IF ERROR COUNT EXCEEDED
012576                          ENDMSG
012576                          L10001:
012576  104423                          TRAP    C$MSG

012600                          BGNMSG  ERR3
012600  005277  170352                  INC     @ERRPOINT       ;BUMP ERROR COUNT
012604  010146                          MOV     R1,-(SP)        ;STORE R1
012606  004767  011104                  JSR     PC,RPTOP        ;REPORT OPERATION
012612  012721  000003                  MOV     #3,(R1)+        ;SET PARAM NUMBER
012616  010321                          MOV     R3,(R1)+        ;INSERT NAME ADD POINTER
012620  005021                          CLR     (R1)+           ;SET IS VALUE
012622  012721  000001                  MOV     #1,(R1)+        ;SET SB VALUE
012626  004767  011652                  JSR     PC,RPTRES       ;REPORT RESULTS
012632  004767  012054                  JSR     PC,RPTREM       ;REPORT REMAINDER
012636  012601                          MOV     (SP)+,R1        ;RESTORE R1
012640  004767  003600                  JSR     PC,CKERLM       ;GO CHECK IF ERROR COUNT EXCEEDED
012644                          ENDMSG
012644                          L10002:
012644  104423                          TRAP    C$MSG

012646                          BGNMSG  ERR4
012646  005277  170304                  INC     @ERRPOINT       ;BUMP ERROR COUNT
012652  010146                          MOV     R1,-(SP)        ;STORE R1
012654  004767  011036                  JSR     PC,RPTOP        ;REPORT OPERATION
012660  012721  000004                  MOV     #4,(R1)+        ;SET PARAM NUMBER
012664  010321                          MOV     R3,(R1)+        ;INSERT NAME ADD POINTER
012666  012721  000001                  MOV     #1,(R1)+        ;SET IS VALUE
012672  005021                          CLR     (R1)+           ;SET SB VALUE
012674  010411                          MOV     R4,(R1)         ;INSERT ADD OF CONDITION POINTER
```

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012676  004767  011602                          JSR     PC,RPTRES       ;REPORT RESULTS
012702  004767  012004                          JSR     PC,RPTREM       ;REPORT REMAINDER
012706  012601                                  MOV     (SP)+,R1        ;RESTORE R1
012710  004767  003530                          JSR     PC,CKERLM       ;GO CHECK IF ERROR COUNT EXCEEDED
012714                                  ENDMSG
012714                                  L10003:
012714  104423                                  TRAP    C$MSG

012716                                  BGNMSG  ERR5
012716  005277  170234                          INC     @ERRPOINT       ;BUMP ERROR COUNT
012722  010146                                  MOV     R1,-(SP)        ;STORE R1
012724  004767  010766                          JSR     PC,RPTOP        ;REPORT OPERATION
012730  012721  000004                          MOV     #4,(R1)+        ;SET PARAM NUMBER
012734  010321                                  MOV     R3,(R1)+        ;INSERT NAME ADD POINTER
012736  005021                                  CLR     (R1)+           ;SET IS VALUE
012740  012721  000001                          MOV     #1,(R1)+        ;SET SB VALUE
012744  010411                                  MOV     R4,(R1)         ;INSERT ADD OF CONDITION POINTER
012746  004767  011532                          JSR     PC,RPTRES       ;REPORT RESULTS
012752  004767  011734                          JSR     PC,RPTREM       ;REPORT REMAINDER
012756  012601                                  MOV     (SP)+,R1        ;RESTORE R1
012760  004767  003460                          JSR     PC,CKERLM       ;GO CHECK IF ERROR COUNT EXCEEDED
012764                                  ENDMSG
012764                                  L10004:
012764  104423                                  TRAP    C$MSG

012766                                  BGNMSG  ERR6
012766  105767  170373                          TSTB    NOERCT          ;TEST IF ERROR COUNTING INHIBITED
012772  001002                                  BNE     17$             ;YES - SKIP
012774  005277  170156                          INC     @ERRPOINT       ;ELSE BUMP ERROR COUNT
013000  010146                          17$:    MOV     R1,-(SP)        ;STORE R1
013002  010346                                  MOV     R3,-(SP)        ;STORE R3
013004  010446                                  MOV     R4,-(SP)        ;STORE R4
013006  010546                                  MOV     R5,-(SP)        ;STORE R5
013010  004767  010702                          JSR     PC,RPTOP        ;REPORT OPERATION
013014  012721  000003                          MOV     #3,(R1)+        ;SET PARAM NUMBER
013020  012761  000001  000002                  MOV     #1,2(R1)        ;INSERT IS VALUE
013026  005067  170072                          CLR     TEMP3           ;CLEAR FOR STATUS STORAGE
013032  016703  170006                          MOV     T.CS,R3         ;GET T.CS
013036  042703  177761                          BIC     #177761,R3      ;AND CLEAR ALL BUT FUNCTION
013042  022703  000004                          CMP     #4,R3           ;CHECK IF IT WAS GET STATUS
013046  001443                                  BEQ     1$              ;YES - STATUS IS IN T.MP, SKIP
013050  012762  000003  000004                  MOV     #GETSTAT,RLDA(R2) ;ELSE DO GET STATUS
013056  012703  000004                          MOV     #4,R3
013062  056703  167744                          BIS     RLDRV,R3
013066  010362  000000                          MOV     R3,RLCS(R2)
013072                                          WAITUS  10.             ;WAIT FOR CONTROLLER READY
013072  012727  000012                          MOV     #10.,(PC)+
013076  000000                                  .WORD   0
013100  016727  167012                          MOV     L$DLY,(PC)+
013104  000000                                  .WORD   0
013106  005367  177772                          DEC     -6(PC)
013112  001375                                  BNE     .-4
013114  005367  177756                          DEC     -22(PC)
013120  001367                                  BNE     .-20
013122  032762  000200  000000                  BIT     #CRDYMSK,RLCS(R2)       ;TEST IF READY
013130  001003                                  BNE     10$             ;YES - SKIP
013132  012703  001000                  9$:     MOV     #BIT9,R3        ;ELSE SET NO DRIVE STATUS BIT
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285 013136  000413                          BR      2$                  ;IN MESSAGE WORD AND SKIP
286 013140  016203  000006          10$:    MOV     RLMP(R2),R3         ;STORE STATUS FOR REPORT
287 013144  010367  167754                  MOV     R3,TEMP3
288 013150  116703  167751                  MOVB    TEMP3+1,R3          ;GET ERROR BITS IN PROPER POSITION
289 013154  000402                          BR      13$
290 013156  116703  167671          1$:     MOVB    T.MP+1,R3           ;GET ERROR BITS FROM MP REG
291 013162  042703  177442          13$:    BIC     #177442,R3          ;CLEAR UNUSED BITS
292 013166  016704  167652          2$:     MOV     T.CS,R4             ;GET ERROR BITS FROM CS REG
293 013172  042704  001777                  BIC     #1777,R4            ;CLEAR UNUSED BITS
294 013176  050403                          BIS     R4,R3               ;MAKE ONE WORD OF POSSIBLE ERRORS
295 013200  032703  002000                  BIT     #OPIERR,R3          ;TEST IF OPI SET
296 013204  001442                          BEQ     115$                ;NO - SKIP
297 013206  032703  010000                  BIT     #HNFERR,R3          ;TEST IF HDR NOT FOUND ERROR
298 013212  001026                          BNE     107$                ;YES - SKIP
299 013214  032703  004000                  BIT     #HCRCERR,R3         ;TEST IF HDR CRC ERR
300 013220  001020                          BNE     105$                ;YES - SKIP
301 013222  012704  010766                  MOV     #MOPERR,R4          ;SET OPI ALONE MESSAGE
302 013226                          100$:   PRINTB  #FMT28,#MRSLT,R4,#MERRS ;REPORT ERROR
    013226  012746  011265                  MOV     #MERRS,-(SP)
    013232  010446                          MOV     R4,-(SP)
    013234  012746  005423                  MOV     #MRSLT,-(SP)
    013240  012746  012453                  MOV     #FMT28,-(SP)
    013244  012746  000004                  MOV     #4,-(SP)
    013250  010600                          MOV     SP,R0
    013252  104414                          TRAP    C$PNTB
    013254  062706  000012                  ADD     #12,SP
303 013260  000430                          BR      120$                ;SKIP
304 013262  012704  010427          105$:   MOV     #MHCRC,R4           ;HDR CRC MESSAGE
305 013266  000757                          BR      100$
306 013270  032703  004000          107$:   BIT     #HCRCERR,R3         ;TEST IF HCRC WITH HDR NOT FND
307 013274  001003                          BNE     109$                ;YES - SKIP
308 013276  012704  010450                  MOV     #MHNF,R4            ;MESSAGE HEADER NOT FOUND
309 013302  000751                          BR      100$
310 013304  012704  010476          109$:   MOV     #MHFCRC,R4          ;HNF AND HCRC MESSAGE
311 013310  000746                          BR      100$                ;SKIP
312 013312  032703  004000          115$:   BIT     #DCKERR,R3          ;TEST IF DATA CHECK SET, NOT OPI
313 013316  001403                          BEQ     118$                ;NO - SKIP
314 013320  012704  010437                  MOV     #MDCRC,R4           ;SET MESSAGE DATA CHECK
315 013324  000740                          BR      100$                ;SKIP
316 013326  032703  010000          118$:   BIT     #DLTERR,R3          ;TEST IF DATA LATE ERROR
317 013332  001403                          BEQ     120$                ;NO - SKIP
318 013334  012704  010464                  MOV     #MDLT,R4            ;SET MESSAGE DATA LATE
319 013340  000732                          BR      100$                ;SKIP
320 013342  012705  100000          120$:   MOV     #BIT15,R5           ;SET BIT POINTER FOR TEST
321 013346  005004                          CLR     R4                  ;CLEAR R4 FOR TABLE COUNT
322 013350  030503                  3$:     BIT     R5,R3               ;TEST IF BIT IS SET
323 013352  001005                          BNE     6$                  ;YES - SKIP TO REPORT
324 013354  005724                  4$:     TST     (R4)+               ;ELSE BUMP TABLE POINTER
325 013356  000241                          CLC                         ;CLEAR CARRY
326 013360  006005                          ROR     R5                  ;SHIFT BIT POINTER TO NEXT BIT
327 013362  001372                          BNE     3$                  ;LOOP IF NOT 0
328 013364  000405                          BR      7$                  ;ELSE REPORT REMAINDER
329 013366  016411  002320          6$:     MOV     RESTBL(R4),(R1)     ;INSERT NAME ADDRESS
330 013372  004767  011106                  JSR     PC,RPTRES           ;REPORT RESULTS
331 013376  000766                          BR      4$                  ;GET NEXT BIT
332 013400  004767  011306          7$:     JSR     PC,RPTREM           ;REPORT REMAINDER
333 013404  005767  167514                  TST     TEMP3               ;TEST IF ANY NEW STATUS
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   334 013410  001414                            BEQ     15$             ;NO - SKIP
   335 013412                                    PRINTB  #FMT17,#STAMES,TEMP3
       013412  016746  167506                    MOV     TEMP3,-(SP)
       013416  012746  010276                    MOV     #STAMES,-(SP)
       013422  012746  012137                    MOV     #FMT17,-(SP)
       013426  012746  000003                    MOV     #3,-(SP)
       013432  010600                            MOV     SP,R0
       013434  104414                            TRAP    C$PNTB
       013436  062706  000010                    ADD     #10,SP
   336 013442  032767  004000  167374   15$:     BIT     #DCKERR,T.CS    ;TEST IF DATA CHECK ERROR
   337 013450  001453                            BEQ     25$             ;NO - SKIP
   338 013452  032767  002000  167364            BIT     #OPIERR,T.CS    ;TEST IF OPI SET
   339 013460  001047                            BNE     25$             ;YES - SKIP
   340 013462  005067  167326                    CLR     MORECE          ;CLEAR COMPARE ERROR COUNT
   341 013466  012701  000200                    MOV     #128.,R1        ;SET COMPARE LENGTH
   342 013472  012703  000001                    MOV     #1,R3           ;SET WORD COUNT
   343 013476  012705  004364                    MOV     #OBUFF,R5       ;SET GOOD WORD POINTER
   344 013502  012704  003764                    MOV     #IBUFF,R4       ;SET TEST WORD POINTER
   345 013506  021514                   18$:     CMP     (R5),(R4)       ;CHECK WORD
   346 013510  001427                            BEQ     19$             ;GOOD - SKIP
   347 013512  026727  167276  000012            CMP     MORECE,#10.     ;TEST IF COMPARE LIMIT REACHED
   348 013520  003021                            BGT     20$             ;YES - SKIP
   349 013522                                    PRINTB  #FMT15,#MWORD,R3,#RESE3,(R4),#RESE4,(R5)
       013522  011546                            MOV     (R5),-(SP)
       013524  012746  011304                    MOV     #RESE4,-(SP)
       013530  011446                            MOV     (R4),-(SP)
       013532  012746  011300                    MOV     #RESE3,-(SP)
       013536  010346                            MOV     R3,-(SP)
       013540  012746  006172                    MOV     #MWORD,-(SP)
       013544  012746  012072                    MOV     #FMT15,-(SP)
       013550  012746  000007                    MOV     #7,-(SP)
       013554  010600                            MOV     SP,R0
       013556  104414                            TRAP    C$PNTB
       013560  062706  000020                    ADD     #20,SP
   350 013564  005267  167224           20$:     INC     MORECE          ;BUMP ERROR COUNTER
   351 013570  022524                   19$:     CMP     (R5)+,(R4)+     ;BUMP POINTERS
   352 013572  005203                            INC     R3              ;BUMP COUNTER
   353 013574  005301                            DEC     R1              ;DEC LENGTH COUNT
   354 013576  001343                            BNE     18$             ;LOOP IF NOT DONE
   355 013600  005767  167210           25$:     TST     MORECE          ;TEST IF ANY COMPARE ERRORS
   356 013604  001421                            BEQ     27$             ;NO - SKIP
   357 013606  012701  000200                    MOV     #128.,R1        ;SET COMPARE LENGTH
   358 013612                                    PRINTB  #FMT27,#TCERR,MORECE,#RESE6,R1
       013612  010146                            MOV     R1,-(SP)
       013614  012746  011316                    MOV     #RESE6,-(SP)
       013620  016746  167170                    MOV     MORECE,-(SP)
       013624  012746  010363                    MOV     #TCERR,-(SP)
       013630  012746  012434                    MOV     #FMT27,-(SP)
       013634  012746  000005                    MOV     #5,-(SP)
       013640  010600                            MOV     SP,R0
       013642  104414                            TRAP    C$PNTB
       013644  062706  000014                    ADD     #14,SP
   359 013650  012605                   27$:     MOV     (SP)+,R5        ;RESTORE R5, 4, 3, 1
   360 013652  012604                            MOV     (SP)+,R4
   361 013654  012603                            MOV     (SP)+,R3
   362 013656  012601                            MOV     (SP)+,R1
   363 013660  004767  002560                    JSR     PC,CKERLM       ;GO CHECK IF ERROR COUNT EXCEEDED
```

```
013664                            ENDMSG
013664                            L10005:
013664  104423                            TRAP    C$MSG

013666                            BGNMSG  ERR7
013666  005277  167264                    INC     @ERRPOINT           ;BUMP ERROR COUNT
013672  010146                            MOV     R1,-(SP)            ;STORE R1
013674  004767  010016                    JSR     PC,RPTOP            ;REPORT OPERATION
013700  012721  000003                    MOV     #3,(R1)+            ;SET PARAM NUMBER
013704  012721  010647                    MOV     #MDRVST,(R1)+       ;INSERT NAME ADD POINTER
013710  016721  167144                    MOV     T.STAT,(R1)+        ;INSERT IS VALUE
013714  010311                            MOV     R3,(R1)             ;INSERT SB VALUE
013716  004767  010562                    JSR     PC,RPTRES           ;REPORT RESULTS
013722  004767  010764                    JSR     PC,RPTREM           ;REPORT REMAINDER
013726  012601                            MOV     (SP)+,R1            ;RESTORE R1
013730  004767  002510                    JSR     PC,CKERLM           ;GO CHECK IF ERROR COUNT EXCEEDED
013734                            ENDMSG
013734                            L10006:
013734  104423                            TRAP    C$MSG

013736                            BGNMSG  ERR8
013736  005277  167214                    INC     @ERRPOINT           ;BUMP ERROR COUNT
013742  010146                            MOV     R1,-(SP)            ;STORE R1
013744  010346                            MOV     R3,-(SP)            ;STORE R3
013746  004767  007744                    JSR     PC,RPTOP            ;REPORT OPERATION
013752  012721  000003                    MOV     #3,(R1)+            ;SET PARAM NUMBER
013756  012721  011052                    MOV     #MCYLOC,(R1)+       ;INSERT NAME ADD POINTER
013762  016711  167064                    MOV     HDWRD1,(R1)         ;GET HEADER WORD
013766  012703  000007                    MOV     #7,R3               ;SET SHIFT COUNT
013772  000241                    3$:     CLC
013774  006011                            ROR     (R1)                ;ALIGN CHAR FOR PRINTING
013776  005303                            DEC     R3                  ;  AS IS VALUE
014000  001374                            BNE     3$
014002  005721                            TST     (R1)+               ;BUMP PARAM POINTER
014004  016711  167072                    MOV     NEWCYL,(R1)         ;INSERT SB VALUE
014010  004767  010470                    JSR     PC,RPTRES           ;REPORT RESULTS
014014  004767  010672                    JSR     PC,RPTREM           ;REPORT REMAINDER
014020  012603                            MOV     (SP)+,R3            ;RESTORE R3
014022  012601                            MOV     (SP)+,R1            ;RESTORE R1
014024  004767  002414                    JSR     PC,CKERLM           ;GO CHECK IF ERROR COUNT EXCEEDED
014030                            ENDMSG
014030                            L10007:
014030  104423                            TRAP    C$MSG

014032                            BGNMSG  ERR9
014032  005277  167120                    INC     @ERRPOINT           ;BUMP ERROR COUNT
014036  010146                            MOV     R1,-(SP)            ;STORE R1
014040  004767  007652                    JSR     PC,RPTOP            ;REPORT OPERATION
014044  012721  000003                    MOV     #3,(R1)+            ;SET PARAM NUMBER
014050  010321                            MOV     R3,(R1)+            ;INSERT NAME ADD POINTER
014052  010421                            MOV     R4,(R1)+            ;SET IS VALUE
014054  010521                            MOV     R5,(R1)+            ;SET SB VALUE
014056  004767  010422                    JSR     PC,RPTRES           ;REPORT RESULTS
014062  004767  010624                    JSR     PC,RPTREM           ;REPORT REMAINDER
014066  012601                            MOV     (SP)+,R1            ;RESTORE R1
014070  004767  002350                    JSR     PC,CKERLM           ;GO CHECK IF ERROR COUNT EXCEEDED
014074                            ENDMSG
```

```
        014074                                  L10010:
        014074  104423                                   TRAP    C$MSG
    415 014076                                  BGNMSG   ERR10
    416 014076  010146                                   MOV     R1,-(SP)          ;STORE R1
    417 014100  005767  166710                           TST     MORECE            ;TEST IF 2ND BAD LINE
    418 014104  001051                                   BNE     3$                ;YES - SKIP
    419 014106  005277  167044                           INC     @ERRPOINT         ;BUMP ERROR COUNT
    420 014112  004767  007600                           JSR     PC,RPTOP          ;REPORT OPERATION
    421 014116                                           PRINTB  #FMT5,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1> ;REPORT ID
        014116  005046                                   CLR     -(SP)
        014120  156716  166707                           BISB    RLDRV+1,(SP)
        014124  012746  006053                           MOV     #DRVNAM,-(SP)
        014130  016746  166672                           MOV     RLBAS,-(SP)
        014134  012746  006042                           MOV     #BASADD,-(SP)
        014140  012746  011567                           MOV     #FMT5,-(SP)
        014144  012746  000005                           MOV     #5,-(SP)
        014150  010600                                   MOV     SP,R0
        014152  104414                                   TRAP    C$PNTB
        014154  062706  000014                           ADD     #14,SP
    422 014160                                           PRINTB  #FMT14,#MRSLT,#MWORD,R3,#RESE3,(R4),#RESE4,(R5)
        014160  011546                                   MOV     (R5),-(SP)
        014162  012746  011304                           MOV     #RESE4,-(SP)
        014166  011446                                   MOV     (R4),-(SP)
        014170  012746  011300                           MOV     #RESE3,-(SP)
        014174  010346                                   MOV     R3,-(SP)
        014176  012746  006172                           MOV     #MWORD,-(SP)
        014202  012746  005423                           MOV     #MRSLT,-(SP)
        014206  012746  012040                           MOV     #FMT14,-(SP)
        014212  012746  000010                           MOV     #10,-(SP)
        014216  010600                                   MOV     SP,R0
        014220  104414                                   TRAP    C$PNTB
        014222  062706  000022                           ADD     #22,SP
    423 014226  000421                                   BR      4$
    424 014230                                  3$:      PRINTB  #FMT15,#MWORD,R3,#RESE3,(R4),#RESE4,(R5) ;REPORT DATA
        014230  011546                                   MOV     (R5),-(SP)
        014232  012746  011304                           MOV     #RESE4,-(SP)
        014236  011446                                   MOV     (R4),-(SP)
        014240  012746  011300                           MOV     #RESE3,-(SP)
        014244  010346                                   MOV     R3,-(SP)
        014246  012746  006172                           MOV     #MWORD,-(SP)
        014252  012746  012072                           MOV     #FMT15,-(SP)
        014256  012746  000007                           MOV     #7,-(SP)
        014262  010600                                   MOV     SP,R0
        014264  104414                                   TRAP    C$PNTB
        014266  062706  000020                           ADD     #20,SP
    425 014272  005267  166516                  4$:      INC     MORECE            ;INC COMPARE ERROR COUNT
    426 014276  012601                                   MOV     (SP)+,R1          ;RESTORE R1
    427 014300  004767  002140                           JSR     PC,CKERLM         ;GO CHECK IF ERROR COUNT EXCEEDED
    428 014304                                  ENDMSG
        014304                                  L10011:
        014304  104423                                   TRAP    C$MSG
    429 014306                                  ENDMOD
    430                                                  .EVEN
    431
    432 014306                                  BGNMOD   HPTCODE
    433 014306                                  BGNHW
        014306  000006                                   .WORD   L10012-L$HW/2
```

```
014310  174400                              .WORD   174400          ;CSR BASE ADDRESS DEFAULT
014312  000160                              .WORD   160             ;VECTOR DEFAULT
014314  000240                              .WORD   240             ;PRIORITY DEFAULT
014316  000001                              .WORD   1               ;TYPE OF DRIVE, RL01=1, RL02=2
014320  000000                              .WORD   0               ;DRIVE NUMBER DEFAULT
014322  000001                              .WORD   1               ;RL11 CONTROLLER
014324                              ENDHW
014324                              L10012:
014324                              ENDMOD

014324                              BGNMOD  SPTCODE
014324                              BGNSW
014324  000006                              .WORD   L10013-L$SW/2
014326  000000                      MISWIW: .WORD   0               ;BIT 0 = USE ALL CYLINDERS
                                                                    ;BIT 1 = USE ALL SECTORS
                                                                    ;BIT 2 = EXECUTE DRIVE SELECT TEST
                                                                    ;BIT 3 = EXECUTE HEAD ALIGNMENT
                                                                    ;BIT 12 = HEAD SELECT SUPPLIED FLAG
                                                                    ;BIT 13 = HILIMIT SPECIFIED FLAG
                                                                    ;BIT 14 = LO LIMIT SPECIFIED FLAG
                                                                    ;BIT 15 = DO MANUAL INTERVENTION
014330  000000                      LOLIMW: .WORD   0
014332  000377                      HILIMW: .WORD   255.
014334  000000                      HEADW:  .WORD   0
014336  000024                      ERLIMW: .WORD   20.             ;ERROR LIMIT
014340  000012                      DCLIMW: .WORD   10.             ;COMPARE ERROR LIMIT
014342                              ENDSW
014342                              L10013:
014342                              ENDMOD

014342                              BGNMOD  DSPCODE
014342                              DISPATCH        16
014342  000020                              .WORD   16
014344  025176                              .WORD   T1
014346  025456                              .WORD   T2
014350  025664                              .WORD   T3
014352  030344                              .WORD   T4
014354  031532                              .WORD   T5
014356  032136                              .WORD   T6
014360  033410                              .WORD   T7
014362  034302                              .WORD   T8
014364  034370                              .WORD   T9
014366  035024                              .WORD   T10
014370  035502                              .WORD   T11
014372  036260                              .WORD   T12
014374  036732                              .WORD   T13
014376  037152                              .WORD   T14
014400  037432                              .WORD   T15
014402  040100                              .WORD   T16
014404                              ENDMOD


                                    ;LOAD PROTECTION TABLE
014404                              BGNPROT
014404  000000                      .WORD     0                         ;P-TABLE OFFSET OF CSR
014406  177777                      .WORD    -1                         ;NOT A MASS-BUSS DRIVE
014410  000010                      .WORD    10                         ;P-TABLE OFFSET OF DRIVE
014412                              ENDPROT
```

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                                .SBTTL  INITIALIZATION CODE

014412                          BGNMOD  INITCODE
014412                          BGNINIT
                                ;CHECK FOR PRESENCE OF A CLOCK
014412  005067  166526          PCLK:   CLR     CLKFLG          ;CLEAR CLOCK FLAG

014416  012700  000120                  MOV     #'P,R0
014422  104462                          TRAP    C$CLCK
014424  010067  166516                  MOV     R0,CLKADR
014430  103004                          BCC     NOPCLK
014432  012767  000001  166504          MOV     #1,CLKFLG       ;INDICATE PRESENCE OF A P-CLOCK
014440  000451                          BR      TCLK            ;P CLOCK EXISTS, DO NOT USE L CLOCK.

014442  012737  014556  000004  NOPCLK: MOV     #TSTCLK,@#4     ;TEST FOR L CLOCK. IF NO CLOCK - SKIP.
014450  005737  177546                  TST     @#177546

014454  012767  000011  166462          MOV     #11,CLKFLG      ;INDICATE THE PRESENCE OF AN L CLOCK.

014462  012737  014514  000100          MOV     #LCLK,@#100     ;L CLOCK VECTOR POINTS TO LCLK.

014470  010146                          MOV     R1,-(SP)        ;SAVE   R1 ANS R2 ON THE STACK.
014472  010246                          MOV     R2,-(SP)

014474  005002                          CLR     R2
014476  012737  000100  177546          MOV     #100,@#177546   ;START THE L CLOCK.

014504  062702  000001          1$:     ADD     #1,R2           ;BUILD SOFTWARE LOOP. USE ADD TO SET FLAGS.
014510  000240                          NOP
014512  000774                          BR      1$

014514  012716  014522          LCLK:   MOV     #LCLK1,@SP      ;MODIFY THE STACK TO RETURN TO LCLK1.
014520  000002                          RTI
014522  005037  177546          LCLK1:  CLR     @#177546        ;STOP THE L CLOCK.

014526  012701  000246                  MOV     #166.,R1        ;THIS IS THE DIVISOR TO GET 100 US.

014532  005067  166412                  CLR     LBASE
014536  005267  166406          1$:     INC     LBASE           ;LBASE IS THE APPROXIMATE NUMBER OF ITERATIONS
014542  160102                          SUB     R1,R2           ;NEEDED TO GIVE 100 US.
014544  100401                          BMI     2$
014546  000773                          BR      1$

014550  012602                  2$:     MOV     (SP)+,R2        ;RESTORE R1 AND R2.
014552  012601                          MOV     (SP)+,R1
014554  000403                          BR      TCLK            ;SKIP RTI HANDLER

014556  012716  014564          TSTCLK: MOV     #TCLK,(SP)      ;ADJUST STACK FOR RTI
014562  000002                          RTI
014564  005767  166354          TCLK:   TST     CLKFLG          ;IF THERE IS NO P OR L CLOCK, DO NOT DO THE
014570  001015                          BNE     1$              ;TEST. PRINT A MESSAGE SAYING WHY THE TEST IS
014572  012746  006664                  MOV     #NOTST,-(SP)    ;ABORTED.
014576  012746  011753                  MOV     #FMT9,-(SP)
014602  012746  000002                  MOV     #2,-(SP)
014606  010600                          MOV     SP,R0
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014610  104417                                  TRAP    C$PNTF
014612  062706  000006                          ADD     #6,SP
014616  012701  000200                          MOV     #200,R1
014622  000111                                  JMP     @R1

014624                                  1$:     SETPRI  #340            ;SET PRIORITY TO 7 TO INHIBIT INTERRUPTS
014624  012700  000340                          MOV     #340,R0
014630  104441                                  TRAP    C$SPRI
014632                                          MANUAL                  ;CHECK IF MANUAL INTERVENTION ALLOWED
014632  104450                                  TRAP    C$MANI
014634                                          BCOMPLETE       2$      ;YES - SKIP
014634  103403                                  BCS     2$
014636  042767  100014  177462                  BIC     #MITEST!DRSELT!HDALIGN,MISWIW ;CLEAR ALL MANUAL
                                                                        ; INTERVENTION FLAGS
014644  005067  166132                  2$:     CLR     SSINDX          ;CLEAR SUBROUTINE STACK INDEX
014650                                          READEF  #EF.PWR         ;POWER FAILURE?
014650  012700  000034                          MOV     #EF.PWR,R0
014654  104447                                  TRAP    C$REFG
014656                                          BNCOMPLETE  4$          ;NO, GO CHECK NEW PASS
014656  103005                                  BCC     4$
014660  016767  165126  166502                  MOV     L$UNIT,PWRFLG   ;SET POWER FAIL FLAG
014666  000167  000406                          JMP     PWCON           ;GO SERVICE POWER FAIL
                                        ;"START" COMMAND SEQUENCE
014672                                  4$:     READEF  #EF.START       ;CHECK IF START
014672  012700  000040                          MOV     #EF.START,R0
014676  104447                                  TRAP    C$REFG
014700                                          BNCOMPLETE      RESTART ;NO - SKIP
014700  103034                                  BCC     RESTART
                                        ;       ON START INITIALIZE TO START AT FIRST DRIVE, CLEAR INTERNAL
                                        ;       PASS COUNT, AND ERROR COUNT.
014702  016767  165104  166164                  MOV     L$UNIT,DRVCNT   ;SET UP UNIT COUNT
014710  005067  166444                  RSTRT:  CLR     PASNUM          ;CLEAR PASS NUMBER
014714  012700  003160                          MOV     #ERRCNT,R0
014720  012701  000100                          MOV     #64.,R1         ;GET A COUNT
014724  005020                          1$:     CLR     (R0)+           ;CLEAR ERROR COUNTER STORAGE AREA
014726  005301                                  DEC     R1
014730  001375                                  BNE     1$              ;LOOP TILL ALL CLEARED
014732  012767  003156  166216                  MOV     #ERRCNT-2,ERRPOINT ;INIT ERROR POINTER
014740  012767  177777  166414                  MOV     #-1,PSETNM      ;SET PARAM SELECT TO INITIAL VALUE
014746  012767  177777  166034                  MOV     #-1,HADONE      ;PRESET HEAD ALIGN DONE FLAG
014754  032767  040000  177344          LAB:    BIT     #LOCYL,MISWIW   ;TEST IF LO LIMIT SET
014762  001002                                  BNE     5$              ;YES - SKIP
014764  005067  177340                          CLR     LOLIMW          ;ELSE CLEAR LO LIMIT
014770  000432                          5$:     BR      SETDON
014772                                  RESTART:
014772                                          READEF  #EF.RESTART     ;CHECK IF RESTART
014772  012700  000037                          MOV     #EF.RESTART,R0
014776  104447                                  TRAP    C$REFG
015000                                          BCOMPLETE       RSTRT   ;NO - SKIP
015000  103743                                  BCS     RSTRT
                                        ;"CONTINUE" COMMAND SEQUENCE
015002                                  CONTINUE:
015002                                          READEF  #EF.CONTINUE    ;TEST IF CONTINUE
015002  012700  000036                          MOV     #EF.CONTINUE,R0
015006  104447                                  TRAP    C$REFG
015010                                          BCOMPLETE       PWCON
015010  103533                                  BCS     PWCON
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                                ;         ON CONTINUE PICK UP UNIT LAST UNDER TEST
015012                                    READEF  #EF.NEW          ;CHECK IF STARTING NEW PASS
015012  012700  000035                    MOV     #EF.NEW,R0
015016  104447                            TRAP    C$REFG
015020                                    BCOMPLETE        PASNEW
015020  103403                            BCS     PASNEW
015022                          NXTPAS:
015022  005767  166046                    TST     DRVCNT           ;TEST IF ALL UNITS CHECKED
015026  001013                            BNE     SETDON           ;NO - SKIP
015030  005267  166324          PASNEW:   INC     PASNUM           ;ELSE BUMP PASS COUNT
015034  012767  003156  166114            MOV     #ERRCNT-2,ERRPOINT ;INIT ERROR POINTER
015042  016767  164744  166024            MOV     L$UNIT,DRVCNT    ;GET ALL DRIVES
015050  012767  177777  166304            MOV     #-1,PSETNM       ;SET PARAM SELECT TO INITIAL
015056  005267  166300          SETDON:   INC     PSETNM           ;NEXT SET OF PARAMETERS
015062  005367  166006                    DEC     DRVCNT           ;DOWN COUNT DRIVE TOTAL
015066  062767  000002  166062            ADD     #2,ERRPOINT      ;UPDATE THE ERROR POINTER
015074  016700  166262                    MOV     PSETNM,R0        ;SET UP TO GET PARAMETERS
015100  012702  003026                    MOV     #RLBAS,R2        ;GET POINTER TO RL11 BASE ADDRESS
015104                                    GPHARD  R0,R1
015104  104442                            TRAP    C$GPHRD
015106  010001                            MOV     R0,R1
015110                                    BCOMPLETE        7$      ;SKIP IF GOOD PARAM
015110  103406                            BCS     7$
015112  005767  166252                    TST     PWRFLG           ;RECENT POWER FAILURE
015116  001741                            BEQ     NXTPAS  ;NO
015120  005367  166244                    DEC     PWRFLG           ;ACCOUNT FOR DRIVE
015124  000736                            BR      NXTPAS
                                ;MOVE P-TABLE CONTENTS TO LOCAL STORAGE
015126  012122                  7$:       MOV     (R1)+,(R2)+      ;STORE CSR
015130  012122                            MOV     (R1)+,(R2)+      ;STORE VECTOR
015132  005721                            TST     (R1)+            ;BUMP PAST PRIORITY
015134  012167  165136                    MOV     (R1)+,T.DRIVE    ;STORE DRIVE TYPE
015140  012122                            MOV     (R1)+,(R2)+
015142  022767  000001  165126            CMP     #1,T.DRIVE
015150  001426                            BEQ     65$
                                ;INITIALIZE RL02 PARAMETERS
015152  012767  000776  165126            MOV     #510.,NXTHL
015160  012767  000777  165114            MOV     #511.,HLMTW
015166  012767  001000  165114            MOV     #512.,GBND
015174  012767  177600  165110            MOV     #177600,CAMSK
015202  012767  177600  165104            MOV     #177600,DIRMSK
015210  012767  177600  165100            MOV     #177600,HDCYL
015216  012767  177000  165060            MOV     #177000,CLRBYT
015224  000425                            BR      PWCON
                                ;INITIALIZE RL01 PARAMETERS
015226  012767  000377  165046  65$:      MOV     #255.,HLMTW
015234  012767  000400  165046            MOV     #256.,GBND
015242  012767  077600  165042            MOV     #77600,CAMSK
015250  012767  077600  165036            MOV     #77600,DIRMSK
015256  012767  077600  165032            MOV     #77600,HDCYL
015264  012767  000376  165014            MOV     #254.,NXTHL
015272  012767  177400  165004            MOV     #177400,CLRBYT

015300  032767  020000  177020  PWCON:    BIT     #HICYL,MISWIW
015306  001003                            BNE     1$
015310  016767  164766  177014            MOV     HLMTW,HILIMW
015316                          1$:       SETVEC  RLVEC,#INTHLR,#340      ;SET UP INTERRUPT VECTOR FOR DRIVE
```

```
        015316  012746  000340                    MOV     #340,-(SP)
        015322  012746  016370                    MOV     #INTHLR,-(SP)
        015326  016746  165476                    MOV     RLVEC,-(SP)
        015332  012746  000003                    MOV     #3,-(SP)
        015336  104437                            TRAP    C$SVEC
        015340  062706  000010                    ADD     #10,SP
    625 015344                                    SETPRI  #0              ;SET PRIORITY TO 0 TO ALLOW INTERRUPTS
        015344  012700  000000                    MOV     #0,R0
        015350  104441                            TRAP    C$SPRI
    626 015352  016702  165450                    MOV     RLBAS,R2        ;SET RL11 BASE ADDRESS POINTER
    627
    628
    630
    631 015356                                    MANUAL                  ;MANUAL INTERVENTION ALLOWED?
        015356  104450                            TRAP    C$MANI
    632 015360                                    BNCOMPLETE      4$      ;NO
        015360  103004                            BCC     4$
    633
    634 015362  005767  165772                    TST     PASNUM          ;YES, CHECK PASS NUMBER
    635 015366  001001                            BNE     4$              ;NOT FIRST PASS, NEED DRIVE UP
    636 015370  000521                            BR      8$              ;FIRST PASS, PROGRAM WILL INSTRUCT USER
    637
    639                                   ;CHECK IF POWER FAILURE WAIT IS NEEDED
    640
    641 015372  005767  165772            4$:     TST     PWRFLG          ;NEEDED?
    642 015376  001516                            BEQ     8$              ;NO, SKIP
    643
    644 015400  016705  165426                    MOV     RLDRV,R5        ;DRIVE SELECT
    645 015404  052705  000200                    BIS     #CRDYMSK,R5     ;SET CRDY
    646 015410  010562  000000                    MOV     R5,RLCS(R2)     ;SELECT DRIVE
    647 015414  012701  000170                    MOV     #120.,R1        ;INITIALIZE WAIT COUNT
    648 015420  032762  000001  000000    9$:     BIT     #DRDYMSK,RLCS(R2)       ;DRIVE UP YET
    649 015426  001102                            BNE     8$              ;YES START TEST
    650
    651 015430                                    WAITMS  10.             ;WAIT A SECOND
        015446  012727  000372                    MOV     #250.,(PC)+
        015452  000000                            .WORD   0
        015454  016727  164436                    MOV     L$DLY,(PC)+
        015460  000000                            .WORD   0
        015462  005367  177772                    DEC     -6(PC)
        015466  001375                            BNE     .-4
        015470  005367  177756                    DEC     -22(PC)
        015474  001367                            BNE     .-20
        015476  104422                            TRAP    C$BRK
    652 015506  005301                            DEC     R1              ;SIXTY GONE BY
    653 015510  001343                            BNE     9$              ;NO
    654 015512                                    PRINTF  #FMT24,#NOPWR   ;REPORT "DRV DID NOT REC'R FROM PWR FAIL"
        015512  012746  006060                    MOV     #NOPWR,-(SP)
        015516  012746  012373                    MOV     #FMT24,-(SP)
        015522  012746  000002                    MOV     #2,-(SP)
        015526  010600                            MOV     SP,R0
        015530  104417                            TRAP    C$PNTF
        015532  062706  000006                    ADD     #6,SP
    655 015536                                    PRINTF  #FMT5,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1> ;REPORT DRIVE UNIBUS
        015536  005046                            CLR     -(SP)
        015540  156716  165267                    BISB    RLDRV+1,(SP)
        015544  012746  006053                    MOV     #DRVNAM,-(SP)
```

```
015550  016746  165252                  MOV     RLBAS,-(SP)
015554  012746  006042                  MOV     #BASADD,-(SP)
015560  012746  011567                  MOV     #FMT5,-(SP)
015564  012746  000005                  MOV     #5,-(SP)
015570  010600                          MOV     SP,R0
015572  104417                          TRAP    C$PNTF
015574  062706  000014                  ADD     #14,SP
                                                                                ;/ADDRESS AND DRIVE NUMBER
015600                                  PRINTF  #FMT3           ;NEW LINE
015600  012746  011553                  MOV     #FMT3,-(SP)
015604  012746  000001                  MOV     #1,-(SP)
015610  010600                          MOV     SP,R0
015612  104417                          TRAP    C$PNTF
015614  062706  000004                  ADD     #4,SP
015620                                  DODU    PSETNM          ;DO DROP UNIT ON DRIVE
015620  016700  165536                  MOV     PSETNM,R0
015624  104451                          TRAP    C$DODU
015626                                  DOCLN                   ;INVOKE CLEAN-UP CODE TO RESTORE DRIVE
015626  104444                          TRAP    C$DCLN
                                                                ;/TO STATIC STATE
015630  005067  165304                  CLR     ERRVEC          ;CLEAR ERROR VECTOR

015634                          8$:

015634                          ENDINIT
015634                          L10015:
015634  104411                          TRAP    C$INIT

015636                          ENDMOD



                                .SBTTL  AUTO DROP SECTION

                                ;THE AUTO DROP SECTION IS INVOKED BY THE DIAGNOSTIC SUPERVISOR WHENEVER THE
                                ;"ADR" FLAG IS SET BY THE OPERATOR. IT IS EXECUTED AFTER THE INITIALIZATION
                                ;CODE AND CHECKS THE DRIVE TO DETERMINE IF IT IS READY TO RECEIVE A COMMAND.
                                ;IF THE DRIVE IS NOT READY IT IS DROPPED FROM THE TEST CYCLE AND THE NEXT
                                ;DRIVE IS ACCESSED. IF THE DRIVE IS READY THE HARDWARE TESTS ARE PERFORMED
                                ;AFTER WHICH THE NEXT DRIVE IS ACCESSED.

015636                          BGNAUTO
015636  005067  165524                  CLR     TRPFLG          ;CLEAR TRAP FLAG
015642                                  SETVEC  ERRVEC,#TRPHAN,#340     ;SET UP TRAP VECTOR TO DETECT
015642  012746  000340                  MOV     #340,-(SP)
015646  012746  016436                  MOV     #TRPHAN,-(SP)
015652  016746  165262                  MOV     ERRVEC,-(SP)
015656  012746  000003                  MOV     #3,-(SP)
015662  104437                          TRAP    C$SVEC
015664  062706  000010                  ADD     #10,SP
                                                                        ;/NON-EXISTENT CONTROLLER UNIBUS
                                                                        ;/ADDRESS
015670  016702  165132                  MOV     RLBAS,R2        ;GET RL11 BASE ADDRESS
015674  005762  000000                  TST     RLCS(R2)        ;ACCESS DRIVE CONTROLLER UNIBUS ADDRESS
015700  005767  165462                  TST     TRPFLG          ;DID TRAP OCCUR?
015704  001447                          BEQ     1$              ;BRANCH TO CHECK DRIVE IF TRAP DID NOT OCCUR
015706                                  PRINTF  #FMT24,#NOCTLR  ;ELSE, PRINT MSG. "DRV DROPPED - NO CNTLR"
015706  012746  006754                  MOV     #NOCTLR,-(SP)
```

```
        015712  012746  012373                          MOV     #FMT24,-(SP)
        015716  012746  000002                          MOV     #2,-(SP)
        015722  010600                                  MOV     SP,R0
        015724  104417                                  TRAP    C$PNTF
        015726  062706  000006                          ADD     #6,SP
    689                                                                         ;PRINT DRIVE INFORMATION
    690 015732                                          PRINTF  #FMT5,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
        015732  005046                                  CLR     -(SP)
        015734  156716  165073                          BISB    RLDRV+1,(SP)
        015740  012746  006053                          MOV     #DRVNAM,-(SP)
        015744  016746  165056                          MOV     RLBAS,-(SP)
        015750  012746  006042                          MOV     #BASADD,-(SP)
        015754  012746  011567                          MOV     #FMT5,-(SP)
        015760  012746  000005                          MOV     #5,-(SP)
        015764  010600                                  MOV     SP,R0
        015766  104417                                  TRAP    C$PNTF
        015770  062706  000014                          ADD     #14,SP
    691 015774                                          PRINTF  #FMT3
        015774  012746  011553                          MOV     #FMT3,-(SP)
        016000  012746  000001                          MOV     #1,-(SP)
        016004  010600                                  MOV     SP,R0
        016006  104417                                  TRAP    C$PNTF
        016010  062706  000004                          ADD     #4,SP
    692 016014                                          DODU    PSETNM          ;DO DROP UNIT ON DRIVE
        016014  016700  165342                          MOV     PSETNM,R0
        016020  104451                                  TRAP    C$DODU
    693 016022  000460                                  BR      2$              ;BRANCH TO EXIT
    694 016024  016705  165002                  1$:     MOV     RLDRV,R5        ;ELSE, GET DRIVE NUMBER
    695 016030  052705  000200                          BIS     #CRDYMSK,R5     ;SET CONTROLLER READY
    696 016034  010562  000000                          MOV     R5,RLCS(R2)     ;LOAD IN THE DRIVE NUMBER
    697 016040  032762  000001  000000                  BIT     #DRDYMSK,RLCS(R2)       ;IS DRIVE READY?
    698 016046  001046                                  BNE     2$              ;BRANCH TO PERFORM TESTS IF DRIVE IS READY
    699 016050                                          PRINTF  #FMT24,#NOTRDY  ;PRINT MSG. 'DRV DROPPED - NOT RDY''
        016050  012746  007003                          MOV     #NOTRDY,-(SP)
        016054  012746  012373                          MOV     #FMT24,-(SP)
        016060  012746  000002                          MOV     #2,-(SP)
        016064  010600                                  MOV     SP,R0
        016066  104417                                  TRAP    C$PNTF
        016070  062706  000006                          ADD     #6,SP
    700                                                                         ;PRINT DRIVE INFORMATION
    701 016074                                          PRINTF  #FMT5,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
        016074  005046                                  CLR     -(SP)
        016076  156716  164731                          BISB    RLDRV+1,(SP)
        016102  012746  006053                          MOV     #DRVNAM,-(SP)
        016106  016746  164714                          MOV     RLBAS,-(SP)
        016112  012746  006042                          MOV     #BASADD,-(SP)
        016116  012746  011567                          MOV     #FMT5,-(SP)
        016122  012746  000005                          MOV     #5,-(SP)
        016126  010600                                  MOV     SP,R0
        016130  104417                                  TRAP    C$PNTF
        016132  062706  000014                          ADD     #14,SP
    702 016136                                          PRINTF  #FMT3
        016136  012746  011553                          MOV     #FMT3,-(SP)
        016142  012746  000001                          MOV     #1,-(SP)
        016146  010600                                  MOV     SP,R0
        016150  104417                                  TRAP    C$PNTF
        016152  062706  000004                          ADD     #4,SP
    703 016156                              DODU    PSETNM          ;DO DROP UNIT ON DRIVE
        016156  016700  165200                  MOV     PSETNM,R0
        016162  104451                          TRAP    C$DODU
    704 016164                          2$:     CLRVEC  ERRVEC          ;RELEASE THE ERROR VECTOR
        016164  016700  164750                  MOV     ERRVEC,R0
        016170  104436                          TRAP    C$CVEC
    705 016172                          ENDAUTO
        016172                          L10016:
        016172  104461                          TRAP    C$AUTO
    706
    707
    708
    709
    710 016174                          BGNMOD  CLNCODE
    711 016174                          BGNCLN
    712
    713 016174                                  SETVEC  ERRVEC,#TRPHAN,#340
        016174  012746  000340                  MOV     #340,-(SP)
        016200  012746  016436                  MOV     #TRPHAN,-(SP)
        016204  016746  164730                  MOV     ERRVEC,-(SP)
        016210  012746  000003                  MOV     #3,-(SP)
        016214  104437                          TRAP    C$SVEC
        016216  062706  000010                  ADD     #10,SP
    714
    715 016222                                  SETPRI #7               ;SET PRIORITY TO 7
        016222  012700  000007                  MOV     #7,R0
        016226  104441                          TRAP    C$SPRI
    716 016230  032762  000200  000000  2$:     BIT     #CRDYMSK,RLCS(R2)       ;TEST IF CONTROLLER READY
    717 016236  001407                          BEQ     3$              ;NO LOOP UNTIL READY
    718 016240  056762  164566  000000          BIS     RLDRV,RLCS(R2)  ;SET DRIVE NUMBER
    719 016246  032762  000001  000000          BIT     #DRDYMSK,RLCS(R2)       ;TEST IF DRIVE BUSY
    720 016254  001027                          BNE     5$              ;NO - SKIP
    721 016256                          3$:     WAITMS  3               ;WAIT 300 MS
        016274  012727  000372                  MOV     #250.,(PC)+
        016300  000000                          .WORD   0
        016302  016727  163610                  MOV     L$DLY,(PC)+
        016306  000000                          .WORD   0
        016310  005367  177772                  DEC     -6(PC)
        016314  001375                          BNE     .-4
        016316  005367  177756                  DEC     -22(PC)
        016322  001367                          BNE     .-20
        016324  104422                          TRAP    C$BRK
    722 016334                          5$:     CLRVEC  RLVEC           ;RELEASE DRIVE VECTOR
        016334  016700  164470                  MOV     RLVEC,R0
        016340  104436                          TRAP    C$CVEC
    723 016342  005767  165022                  TST     PWRFLG          ;PWR FAIL SET
    724 016346  001402                          BEQ     7$              ;NO
    725 016350  005367  165014                  DEC     PWRFLG
    726 016354                          7$:     CLRVEC  ERRVEC
        016354  016700  164560                  MOV     ERRVEC,R0
        016360  104436                          TRAP    C$CVEC
    727 016362                          ENDCLN
        016362                          L10017:
        016362  104412                          TRAP    C$CLEAN
    728
    729 016364                          BGNDU
    730 016364  000240                          NOP
```

```
016366                                  ENDDU
016366                                  L10020:
016366  104453                                  TRAP    C$DU

016370                                  ENDMOD



                                        .SBTTL  INTERRUPT SERVICE ROUTINES

016370                                  BGNSRV  INTHLR
                                        ;INTERRUPT HANDLER FOR DRIVE ABORTS WAIT TIMER AND STORES ALL RL11 REGISTERS
016370  005067  164546                          CLR     DLYCNT          ;CLEAR UNELAPSED DELAY COUNT
016374  012267  164444                          MOV     (R2)+,T.CS      ;STORE RL REGISTERS
016400  012267  164442                          MOV     (R2)+,T.BA
016404  012267  164440                          MOV     (R2)+,T.DA
016410  011267  164436                          MOV     (R2),T.MP
016414  012767  177777  164364                  MOV     #-1,DONE        ;SET DONE FLAG
016422  016702  164400                          MOV     RLBAS,R2        ;RESTORE R2
016426                                  ENDSRV
016426                                  L10021:
016426  000002                                  RTI

                                        ;INTERRUPT SERVICE ROUTINE FOR P-CLOCK DECREMENTS DELAY COUNTER AT 100-MICROSECOND
                                        ;TIME INTERVALS
016430                                  BGNSRV  CLKINT
016430  005367  164506                          DEC     DLYCNT          ;DECREMENT CLOCK DELAY COUNTER
016434                                  ENDSRV
016434                                  L10022:
016434  000002                                  RTI

                                        ;INTERRUPT SERVICE ROUTINE SETS TRAP FLAG WHEN A NON-EXISTENT UNIBUS ADDRESS IS
                                        ;ACCESSED
016436                                  BGNSRV  TRPHAN
016436  005267  164724                          INC     TRPFLG          ;INDICATE THAT TRAP OCCURRED
016442                                  ENDSRV
016442                                  L10023:
016442  000002                                  RTI


```

```
                                        .SBTTL  GLOBAL SUBROUTINES


   016444                               BGNMOD  GLBSUB



                                        ;       ERROR LIMIT CHECKING ROUTINE
                                        ;       DROPS DRIVE IF ERROR LIMIT EXCEEDED
   016444  027767  164506  175664  CKERLM: CMP     @ERRPOINT,ERLIMW        ;TEST IF ERROR LIMIT EXCEEDED
   016452  002453                          BLT     1$                      ;NO - SKIP
   016454                                  INLOOP                          ;CHECK IF IN ERROR LOOP
   016454  104420                          TRAP    C$INLP
   016456                                  BCOMPLETE       1$              ;YES - SKIP
   016456  103451                          BCS     1$
   016460                                  PRINTF  #FMT25,ERLIMW,#MEXERS ;PRINT MSG. ''OVER ERROR LIMIT - UNIT DROPPED''
   016460  012746  011225                  MOV     #MEXERS,-(SP)
   016464  016746  175646                  MOV     ERLIMW,-(SP)
   016470  012746  012400                  MOV     #FMT25,-(SP)
   016474  012746  000003                  MOV     #3,-(SP)
   016500  010600                          MOV     SP,R0
   016502  104417                          TRAP    C$PNTF
   016504  062706  000010                  ADD     #10,SP
   016510                                  PRINTF  #FMT5,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1> ;PRINT DRIVE INFORMATION
   016510  005046                          CLR     -(SP)
   016512  156716  164315                  BISB    RLDRV+1,(SP)
   016516  012746  006053                  MOV     #DRVNAM,-(SP)
   016522  016746  164300                  MOV     RLBAS,-(SP)
   016526  012746  006042                  MOV     #BASADD,-(SP)
   016532  012746  011567                  MOV     #FMT5,-(SP)
   016536  012746  000005                  MOV     #5,-(SP)
   016542  010600                          MOV     SP,R0
   016544  104417                          TRAP    C$PNTF
   016546  062706  000014                  ADD     #14,SP
   016552                                  PRINTF  #FMT3
   016552  012746  011553                  MOV     #FMT3,-(SP)
   016556  012746  000001                  MOV     #1,-(SP)
   016562  010600                          MOV     SP,R0
   016564  104417                          TRAP    C$PNTF
   016566  062706  000004                  ADD     #4,SP
   016572                                  DODU    PSETNM                  ;DROP DRIVE
   016572  016700  164564                  MOV     PSETNM,R0
   016576  104451                          TRAP    C$DODU
   016600                                  DOCLN                           ;GO TO CLEAN UP
   016600  104444                          TRAP    C$DCLN
   016602  000207                  1$:     RTS     PC




                                        ;       READ AND STORE ALL RL11 REGISTERS
   016604  016267  000000  164232  READRL: MOV     RLCSR(R2),T.CS  ;GET CS REG
   016612  016267  000002  164226          MOV     RLBA(R2),T.BA   ;GET BUS ADDRESS REG
   016620  016267  000004  164222          MOV     RLDA(R2),T.DA   ;GET DISK ADDRESS
   016626  016267  000006  164216          MOV     RLMP(R2),T.MP   ;GET MULTI-PURPOSE REG
   016634  000207                          RTS     PC              ;RETURN
```

```


                                        ;       WAIT FOR CONTROLLER TIMEOUT TO FORCE INTERRUPT ROUTINE
016636  011646                          WAITIN: MOV     (SP),-(SP)         ;MAKE ROOM FOR ERROR POINTER
016640  005066  000002                          CLR     2(SP)              ;CLEAR FOR POINTER
016644  032762  000200  000000                  BIT     #CRDYMSK,RLCSR(R2)       ;TEST IF CONTROLLER READY
016652  001420                                  BEQ     4$                 ;NO - SKIP TO WAIT
016654  004767  177724                          JSR     PC,READRL          ;READ ALL RL REGS
016660  005767  164122                          TST     DONE               ;TEST IF INTERRUPT OCCURRED
016664  001453                                  BEQ     5$                 ;NO - GO SET NO INTERRUPT ERR FLAG
016666  012766  006200  000002  1$:     MOV     #MTOSLOW,2(SP)     ;ELSE SET TOO SLOW ERROR POINTER
016674  032767  002000  164142                  BIT     #OPIERR,T.CS       ;TEST IF OPI SET
016702  001403                                  BEQ     2$                 ;NO - SKIP
016704  012766  006220  000002                  MOV     #MDRRES,2(SP)      ;SET MESSAGE FOR NO DRIVE RESPONSE
016712  000207                          2$:     RTS     PC                 ;RETURN
016714  012767  000001  164220  4$:     MOV     #1,DLYCNT          ;INITIALIZE DELAY COUNT
016722  006367  164214                          ASL     DLYCNT             ;MULTIPLY BY 2
016726  006367  164210                          ASL     DLYCNT             ;MULTIPLY BY 2 AGAIN
016732  012727  000012                          MOV     #10.,(PC)+         ;IMPLEMENT TIME DELAY LOOP
016736  000000                                  .WORD   0
016740  016727  163152                          MOV     L$DLY,(PC)+
016744  000000                                  .WORD   0
016746  005367  177772                          DEC     -6(PC)
016752  001375                                  BNE     .-4
016754  005367  177756                          DEC     -22(PC)
016760  001367                                  BNE     .-20
016762  032762  000200  000000                  BIT     #CRDYMSK,RLCS(R2) ;TEST IF READY NOW SET
016770  001006                                  BNE     3$                 ;YES - SKIP
016772  004767  177606                          JSR     PC,READRL          ;READ RL REGS
016776  012766  006273  000002                  MOV     #MCONHNG,2(SP)     ;SET MESSAGE FOR CONTROLLER HUNG
017004  000742                                  BR      2$                 ;SKIP
017006  005767  163774                  3$:     TST     DONE               ;ELSE CHECK IF INTERRUPT OCCURRED
017012  001325                                  BNE     1$                 ;YES - SKIP TO SET TOO SLOW
017014  004767  177564                  5$:     JSR     PC,READRL          ;READ RL REGS
017020  012766  006240  000002                  MOV     #MNOINT,2(SP)      ;ELSE SET NO INTERRUPT FLAG
017026  000731                                  BR      2$                 ;GO TO RETURN



                                        ;       OPERATION AND TEST INITIALIZE ROUTINE
017030  005067  163750                  TSTINT: CLR     OPFLAG             ;CLEAR OPERATION FLAGS
017034  105067  164325                          CLRB    NOERCT             ;RESET INHIBIT ERROR COUNTING
017040  005067  163750                          CLR     MORECE             ;RESET MORE COMPARE ERRORS
017044  000207                                  RTS     PC



                                        ;       GET STATUS AND GET STATUS WITH RESET ROUTINE
017046  016746  164054                  GSTATR: MOV     TEMP4,-(SP)        ;STORE TEMP4
017052  012767  000013  164046                  MOV     #GETSTAT!DRSET,TEMP4     ;SET FOR RESET
017060  000412                                  BR      GSTATG
017062  016746  164040                  GSTATC: MOV     TEMP4,-(SP)        ;STORE TEMP4
017066  012767  000003  164032                  MOV     #GETSTAT,TEMP4     ;SET FOR NO RESET
017074  000404                                  BR      GSTATG
017076  016746  164024                  GSTAT:  MOV     TEMP4,-(SP)        ;STORE TEMP4
017102  005067  164020                          CLR     TEMP4              ;SET FOR SAVE L. AND T. REGS
017106  010346                          GSTATG: MOV     R3,-(SP)           ;STORE R3
017110  016703  163666                          MOV     SSINDX,R3          ;GET SUBROUTINE INDEX
```

```
017114  005723                          TST     (R3)+                   ;BUMP IT FOR NEXT ENTRY
017116  016663  000004  002404          MOV     4(SP),SUBSTK(R3)  ;INSERT THIS CALL
017124  162763  000004  002404          SUB     #4,SUBSTK(R3)     ;ADJUST IT TO CALLING LOCATION
017132  010367  163644                  MOV     R3,SSINDX               ;STORE IT BACK
017136  010046                          MOV     R0,-(SP)                ;STORE R0
017140  010146                          MOV     R1,-(SP)                ;STORE R1
017142  012767  000002  163646          MOV     #2,ERRSWI               ;SET FOR NO ERROR RETURN
017150  032767  000010  163750          BIT     #DRSET,TEMP4            ;TEST IF DRIVE RESET
017156  001525                          BEQ     11$                     ;NO - SKIP
017160  032762  040000  000000          BIT     #DRVERR,RLCS(R2)  ;TEST IF DRIVE ERROR SET
017166  001427                          BEQ     49$                     ;NO - SKIP
017170                                  WAITMS  3                       ;WAIT FOR DRIVE TO SETTLE
017206  012727  000372                  MOV     #250.,(PC)+
017212  000000                          .WORD   0
017214  016727  162676                  MOV     L$DLY,(PC)+
017220  000000                          .WORD   0
017222  005367  177772                  DEC     -6(PC)
017226  001375                          BNE     .-4
017230  005367  177756                  DEC     -22(PC)
017234  001367                          BNE     .-20
017236  104422                          TRAP    C$BRK
                                .NLIST  ME
017246  012701  000062          49$:    MOV     #50.,R1                 ;INITIALIZE WAIT COUNTER
017252  004767  177620          50$:    JSR     PC,GSTAT                ;GET DRIVE STATUS
017256  020110                          3$
017260  032767  000001  163556          BIT     #DRDYMSK,T.CS           ;TEST IF DRIVE READY
017266  001077                          BNE     5$                      ;YES - GO DO CLEAR
017270  032767  000020  163554          BIT     #HOSTAT,T.MP            ;ELSE TEST IF HEADS OUT
017276  001010                          BNE     51$                     ;YES - BYPASS RELOAD WAIT FLAG SETTING
017300  032767  144000  163544          BIT     #SPDSTAT!HCESTAT!WDESTAT,T.MP ;TEST IF DRIVE HAS ERROR
                                                                                      ;THAT CAUSED HEADS TO
                                                                                      ;UNLOAD
017306  001467                          BEQ     5$                      ;NO - SKIP
017310  052767  040000  163466          BIS     #RELDWT,OPFLAG          ;ELSE SET WAIT FLAG
017316  000463                          BR      5$                      ;SKIP TO CLEAR
017320  032767  040000  163516  51$:    BIT     #DRVERR,T.CS            ;TEST IF DRIVE ERROR NOW
017326  001057                          BNE     5$                      ;YES - SKIP TO CLEAR
017330                                  WAITMS  1                       ;WAIT FOR DRIVE TO GET ERROR, READY, OR HEADS OUT
017346  012727  000372                  MOV     #250.,(PC)+
017352  000000                          .WORD   0
017354  016727  162536                  MOV     L$DLY,(PC)+
017360  000000                          .WORD   0
017362  005367  177772                  DEC     -6(PC)
017366  001375                          BNE     .-4
017370  005367  177756                  DEC     -22(PC)
017374  001367                          BNE     .-20
017376  104422                          TRAP    C$BRK
017406  005301                          DEC     R1                      ;DEC WAIT COUNTER
017410  001320                          BNE     50$                     ;IF NOT DONE, LOOP
017412  012703  011103                  MOV     #MUNDEF,R3              ;MESSAGE FOR UNDEFINED STATE
017416                                  ERRHRD  10001.,,ERR1
017416  104456                          TRAP    C$ERHRD
017420  023421                          .WORD   10001
017422  000000                          .WORD   0
017424  012464                          .WORD   ERR1
017426  000167  000452                  JMP     14$                     ;EXIT
017432  005767  163470          11$:    TST     TEMP4                   ;TEST IF SAVE REGISTERS
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    123 017436  001013                          BNE     5$                  ;NO SKIP
    124 017440  012701  000004                  MOV     #4,R1               ;SET SAVE COUNT
    125 017444  012703  003044                  MOV     #L.MP+2,R3          ;SET ADDRESS OF FIRST SAVE
    126 017450  014346                  8$:     MOV     -(R3),-(SP)         ;PUT REG ON STACK
    127 017452  005301                          DEC     R1                  ;DEC COUNT
    128 017454  001375                          BNE     8$                  ;LOOP UNTIL ALL SAVED
    129 017456  012767  000003  163354          MOV     #GETSTAT,L.DA       ;SET FOR GET STATUS
    130 017464  000403                          BR      6$                  ;SKIP
    131 017466  016767  163434  163344  5$:     MOV     TEMP4,L.DA          ;INSERT PRESET FOR STATUS
    132 017474                          6$:
    133 017474  005067  163306                  CLR     DONE                ;CLEAR INTERRUPT FLAG
    134 017500  016767  163326  163326          MOV     RLDRV,L.CS          ;SET UP TO GET STATUS
    135 017506  042767  002000  163320          BIC     #BIT10,L.CS         ;CLEAR FOR DRIVE 4 - 7 SPEC'D
    136 017514  052767  000104  163312          BIS     #GTSTAT,L.CS
    137 017522  016762  163312  000004          MOV     L.DA,RLDA(R2)       ;LOAD RL REGS
    138 017530  016762  163300  000000          MOV     L.CS,RLCSR(R2)      ;LOAD CS REG
    139 017536                                  WAITUS  1                   ;WAIT FOR INTERRUPT
        017536  012727  000001                  MOV     #1,(PC)+
        017542  000000                          .WORD   0
        017544  016727  162346                  MOV     L$DLY,(PC)+
        017550  000000                          .WORD   0
        017552  005367  177772                  DEC     -6(PC)
        017556  001375                          BNE     .-4
        017560  005367  177756                  DEC     -22(PC)
        017564  001367                          BNE     .-20
    140 017566  005767  163214                  TST     DONE                ;CHECK IF INTERRUPT OCCURRED
    141 017572  001535                          BEQ     1$                  ;NO - SKIP
    142 017574  016767  163252  163256  4$:     MOV     T.MP,T.STAT         ;STORE MP REGISTER
    143 017602  042767  177770  163250          BIC     #^C<STAMSK>,T.STAT ;CLEAR ALL BUT STATE
    144 017610  032767  000010  163222          BIT     #DRSET,L.DA         ;TEST IF RESET WAS SPECIFIED
    145 017616  001534                          BEQ     3$                  ;NO - SKIP TO EXIT
    146 017620  032767  040000  163156          BIT     #RELDWT,OPFLAG      ;TEST IF RELOAD WAIT FLAG SET
    147 017626  001451                          BEQ     12$                 ;NO - SKIP
    148 017630  012701  001130                  MOV     #600.,R1            ;INITIALIZE WAIT COUNTER
    149 017634  032762  000001  000000  13$:    BIT     #DRDYMSK,RLCS(R2) ;TEST IF DRIVE NOW READY
    150 017642  001043                          BNE     12$                 ;YES - SKIP
    151 017644                                  WAITMS  1                   ;CALL WAIT
        017662  012727  000372                  MOV     #250.,(PC)+
        017666  000000                          .WORD   0
        017670  016727  162222                  MOV     L$DLY,(PC)+
        017674  000000                          .WORD   0
        017676  005367  177772                  DEC     -6(PC)
        017702  001375                          BNE     .-4
        017704  005367  177756                  DEC     -22(PC)
        017710  001367                          BNE     .-20
        017712  104422                          TRAP    C$BRK
    152 017722  005301                          DEC     R1                  ;DEC COUNT
    153 017724  001343                          BNE     13$                 ;LOOP IF NOT 0
    154 017726  004767  177144                  JSR     PC,GSTAT            ;GET DRIVE STATUS
    155 017732  020110                          3$                          ;ERROR RETURN
    156 017734  012703  011150                  MOV     #MRLFAL,R3          ;SET RESULT MESSAGE POINTER
    157 017740                                  ERRHRD  10003.,,ERR1
        017740  104456                          TRAP    C$ERHRD
        017742  023423                          .WORD   10003
        017744  000000                          .WORD   0
        017746  012464                          .WORD   ERR1
    158 017750  000455                          BR      14$                 ;GO TO EXIT
    159 017752                            12$:    WAITUS  10.             ;WAIT
        017752  012727  000012                    MOV     #10.,(PC)+
        017756  000000                            .WORD   0
        017760  016727  162132                    MOV     L$DLY,(PC)+
        017764  000000                            .WORD   0
        017766  005367  177772                    DEC     -6(PC)
        017772  001375                            BNE     .-4
        017774  005367  177756                    DEC     -22(PC)
        020000  001367                            BNE     .-20
    160 020002  004767  177070                    JSR     PC,GSTAT        ;GET DRIVE STATUS
    161 020006  020110                            3$
    162 020010  032767  100000  163026            BIT     #ANYERR,T.CS    ;TEST IF ANY ERROR
    163 020016  001434                            BEQ     3$              ;NO - SKIP
    164 020020  032767  001000  163024            BIT     #VCSTAT,T.MP    ;CHECK IF VOLUME CHECK RESET
    165 020026  001403                            BEQ     7$              ;YES SKIP
    166 020030  012703  006327                    MOV     #VCNRST,R3      ;SET REASON POINTER
    167 020034  000417                            BR      2$              ;EXIT
    168 020036  032767  040000  163000    7$:     BIT     #DRVERR,T.CS    ;CHECK IF DRIVE ERROR
    169 020044  001405                            BEQ     9$              ;NO - SKIP
    170 020046                                    ERRHRD  10004.,,ERR6
        020046  104456                            TRAP    C$ERHRD
        020050  023424                            .WORD   10004
        020052  000000                            .WORD   0
        020054  012766                            .WORD   ERR6
    171 020056  000412                            BR      14$             ;EXIT
    172 020060  012703  006350            9$:     MOV     #UNXERR,R3      ;SET REASON POINTER
    173 020064  000403                            BR      2$              ;EXIT
    174 020066  004767  176544            1$:     JSR     PC,WAITIN       ;WAIT FOR INTERRUPT
    175 020072  012603                            MOV     (SP)+,R3        ;STORE REASON POINTER FOR RETURN
    176 020074                            2$:     ERRHRD  10002.,,ERR1
        020074  104456                            TRAP    C$ERHRD
        020076  023422                            .WORD   10002
        020100  000000                            .WORD   0
        020102  012464                            .WORD   ERR1
    177 020104  005067  162706            14$:    CLR     ERRSWI          ;CLEAR FOR ERROR RETURN
    178 020110  005767  163012            3$:     TST     TEMP4           ;TEST IF REGISTERS WERE SAVED
    179 020114  001007                            BNE     22$             ;NO - SKIP
    180 020116  012703  003034                    MOV     #L.CS,R3        ;SET POINTER TO RESTORE
    181 020122  012701  000004                    MOV     #4,R1           ;SET REGISTER COUNT
    182 020126  012623                    20$:    MOV     (SP)+,(R3)+     ;RESTORE REG
    183 020130  005301                            DEC     R1              ;DEC COUNT
    184 020132  001375                            BNE     20$             ;LOOP UNTIL ALL ARE RESTORED
    185 020134  162767  000002  162640    22$:    SUB     #2,SSINDX       ;REMOVE ENTRY FROM SUBROUTINE STACK
    186 020142  012601                            MOV     (SP)+,R1        ;RESTORE R1
    187 020144  012600                            MOV     (SP)+,R0        ;RESTORE R0
    188 020146  012603                            MOV     (SP)+,R3        ;RESTORE R3
    189 020150  012667  162752                    MOV     (SP)+,TEMP4     ;RESTORE TEMP4
    190 020154  005767  162636                    TST     ERRSWI          ;TEST IF ERROR RETURN
    191 020160  001404                            BEQ     99$             ;YES - SKIP
    192 020162  066716  162630                    ADD     ERRSWI,(SP)     ;ADD IN FOR NO ERROR RETURN
    193 020166  000240                            NOP
    194 020170  000207                            RTS     PC
    195 020172  017616  000000            99$:    MOV     @(SP),(SP)      ;SET ERROR RETURN ADDRESS
    196 020176  000240                            NOP
    197 020200  000207                            RTS     PC
    198
    199
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                                ;       GET DRIVE STATE ROUTINE
020202  010346                  GDRSTA: MOV     R3,-(SP)           ;SAVE R3
020204  012701  0C0004                  MOV     #4,R1              ;INITIALIZE REGISTER SAVE COUNT
020210  012703  003044                  MOV     #L.MP+2,R3         ;INITIALIZE ADDRESS OF FIRST SAVE
020214  014346                  1$:     MOV     -(R3),-(SP)        ;SAVE REGISTER ON STACK
020216  005301                          DEC     R1                 ;DECREMENT REGISTER SAVE COUNT
020220  001375                          BNE     1$                 ;LOOP UNTIL ALL 4 REGISTERS ARE SAVED
020222  012767  000003  162610          MOV     #GETSTAT,L.DA      ;SET UP DISK ADDRESS REGISTER FOR GET STATUS
                                                                   ;/COMMAND
020230  005067  162552                  CLR     DONE               ;CLEAR INTERRUPT FLAG
020234  016767  162572  162572          MOV     RLDRV,L.CS         ;SET UP CONTROL STATUS REGISTER WITH
                                                                   ;/DRIVE NUMBER
020242  042767  002000  162564          BIC     #BIT10,L.CS        ;CLEAR FOR DRIVES 4-7 SPECIFIED
020250  052767  000104  162556          BIS     #GTSTAT,L.CS       ;INITIALIZE CONTROL STATUS REGISTER FOR
                                                                   ;/GET STATUS COMMAND
020256  016762  162556  000004          MOV     L.DA,RLDA(R2)      ;INITIALIZE DISK ADDRESS REGISTER FOR
                                                                   ;/GET STATUS COMMAND
020264  016762  162544  000000          MOV     L.CS,RLCSR(R2)     ;LOAD CONTROL STATUS REGISTER TO EXECUTE
                                                                   ;/GET STATUS COMMAND
020272  105762  000000          5$:     TSTB    RLCS(R2)           ;WAIT FOR CONTROLLER READY INDICATING
020276  001775                          BEQ     5$                 ;/RECEIPT OF GET STATUS COMMAND
020300  005767  162502                  TST     DONE               ;INTERRUPT OCCURRED?
020304  001416                          BEQ     3$                 ;BRANCH IF NOT
020306  016767  162540  162544          MOV     T.MP,T.STAT        ;GET CONTENTS OF MULTI-PURPOSE REGISTER
020314  042767  177770  162536          BIC     #^C<STAMSK>,T.STAT ;CLEAR ALL BUT STATE DR.VE BITS
020322  012703  003034                  MOV     #L.CS,R3           ;INITIALIZE POINTER TO RESTORE RL REGISTERS
020326  012701  000004                  MOV     #4,R1              ;INITIALIZE REGISTER SAVE COUNT
020332  012623                  2$:     MOV     (SP)+,(R3)+        ;RESTORE REGISTERS
020334  005301                          DEC     R1                 ;DECREMENT REGISTER SAVE COUNT
020336  001375                          BNE     2$                 ;LOOP UNTIL ALL 4 REGISTERS ARE RESTORED
020340  000402                          BR      4$
020342  004767  176270          3$:     JSR     PC,WAITIN          ;WAIT FOR INTERRUPT
020346  012603                  4$:     MOV     (SP)+,R3           ;RESTORE R3
020350  000207                          RTS     PC                 ;RETURN



                                ;       SEEK ROUTINE
020352  012767  177777  162540  XSEEKT: MOV     #-1,TEMP1          ;SET SPECIAL TIMING SEEK FLAG
020360  000402                          BR      XSEEK1
020362  005067  162532          XSEEK:  CLR     TEMP1              ;CLEAR SPECIAL TIMING SEEK FLAG
020366  010346                  XSEEK1: MOV     R3,-(SP)           ;STORE R3
020370  016703  162406                  MOV     SSINDX,R3          ;GET SUBROUTINE INDEX
020374  005723                          TST     (R3)+              ;BUMP IT FOR NEXT ENTRY
020376  016663  000002  002404          MOV     2(SP),SUBSTK(R3) ;INSERT THIS CALL
020404  162763  000004  002404          SUB     #4,SUBSTK(R3)      ;ADJUST IT TO CALLING LOCATION
020412  010367  162364                  MOV     R3,SSINDX          ;STORE IT BACK
020416  010046                          MOV     R0,-(SP)
020420  010146                          MOV     R1,-(SP)
020422  010546                          MOV     R5,-(SP)           ;STORE REG
020424  012767  000002  162364          MOV     #2,ERRSWI          ;SET FOR NO ERROR RETURN
020432  005067  162440                  CLR     DIFAUG             ;CLEAR DIFFERENCE ARGUMENT (FOR SEEKING
                                                                   ;    PAST GUARD BAND)
020436  004767  002560                  JSR     PC,GETPOS          ;GET PRESENT POSITION
020442  021112                          65$
020444  016767  162434  162426          MOV     CURCYL,OLDCYL      ;MOVE CURRENT TO OLD CYLINDER
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020452  026767  162424  161622          CMP     NEWCYL,HLMTW     ;TEST IF NEW IS GREATER THAN 255
020460  003427                          BLE     3$               ;NO - SKIP
020462  166767  161614  162412          SUB     HLMTW,NEWCYL     ;ELSE SUBTRACT 255.
020470  016767  162406  162400          MOV     NEWCYL,DIFAUG    ;STORE DIFFERENCE AS ARGUMENT
020476  016767  161600  162376          MOV     HLMTW,NEWCYL     ;SET NEWCYL AS 255.
020504  022767  000001  161564          CMP     #1,T.DRIVE
020512  001424                          BEQ     6$
020514  162767  000001  162360          SUB     #1,NEWCYL
020522  012767  000001  162360          MOV     #1,DESSGN
020530  012767  000001  162350          MOV     #1,DESDIF
020536  000451                          BR      18$
020540  005767  162336          3$:     TST     NEWCYL           ;TEST IF NEWCYL HAS NEGATIVE VALUE
020544  100007                          BPL     6$               ;NO - SKIP
020546  005467  162330                  NEG     NEWCYL           ;ELSE MAKE IT POSITIVE
020552  016767  162324  162316          MOV     NEWCYL,DIFAUG    ;AND STORE IT AS ARGUMENT
020560  005067  162316                  CLR     NEWCYL           ;AND SET NEWCYL TO 0
020564  016705  162314          6$:     MOV     CURCYL,R5        ;COMPUTE DIFFERENCE AND NEW CYLINDER
020570  166705  162306                  SUB     NEWCYL,R5        ;SUB NEWCYL FROM CURCYL
020574  100005                          BPL     13$              ;IF DIFF IS POSITIVE - SKIP(REV SEEK)
020576  012767  000001  162304          MOV     #1,DESSGN        ;ELSE SET SIGN FOR FORWARD
020604  005405                          NEG     R5               ;MAKE DIFFERENCE POSITIVE
020606  000402                          BR      14$              ;SKIP
020610  005067  162274          13$:    CLR     DESSGN           ;SET SIGN FOR REVERSE
020614  010567  162266          14$:    MOV     R5,DESDIF        ;STORE DIFFERENCE
020620  005767  162252                  TST     DIFAUG           ;IS THERE A DIFFERENCE ARGUMENT
020624  001416                          BEQ     18$              ;NO - SKIP
020626  026767  162250  161446          CMP     NEWCYL,HLMTW     ;CHECK IF NEW CYL IS 255.
020634  001007                          BNE     17$              ;NO - SKIP
020636  012767  000001  162244          MOV     #1,DESSGN        ;ELSE FORCE SIGN FOR FORWARD
                                                                 ;(INNER GUARD BAND)
020644  022767  000001  161424          CMP     #1,T.DRIVE
020652  001003                          BNE     18$
020654  066767  162216  162224  17$:    ADD     DIFAUG,DESDIF
020662                          18$:
020662  012705  003034                  MOV     #L.CS,R5         ;GET RL REG ADDRESS
020666  012715  000106                  MOV     #SEEK,(R5)       ;SET FOR SEEK
020672  056715  162134                  BIS     RLDRV,(R5)       ;INSERT DRIVE NUMBER
020676  042725  002000                  BIC     #BIT10,(R5)+     ;CLEAR IF DRIVE 4 - 7 SPEC'D
020702  005025                          CLR     (R5)+            ;CLEAR BUS ADDRESS
020704  016715  162176                  MOV     DESDIF,(R5)      ;LOAD DIFFERENCE
020710  012700  000007                  MOV     #7,R0            ;SET TO SHIFT DIFFERENCE
020714  006315                  21$:    ASL     (R5)
020716  005300                          DEC     R0
020720  001375                          BNE     21$              ;LOOP UNTIL ALIGNED
020722  005767  162162                  TST     DESSGN           ;TEST SIGN
020726  001402                          BEQ     23$              ;SKIP IF 0
020730  052715  000004                  BIS     #DIRBIT,(R5)     ;ELSE INSERT SIGN
020734  005767  162152          23$:    TST     DESHD            ;TEST IF HEAD 0
020740  001402                          BEQ     25$              ;YES - SKIP
020742  052715  000020                  BIS     #HDSEL,(R5)      ;ELSE SET HEAD BIT
020746  052725  000001          25$:    BIS     #MBSET0,(R5)+    ;INSERT MARKER BIT
020752  004767  000504                  JSR     PC,RDYCHK        ;CHECK IF DRIVE READY
020756  021112                          65$
020760  005067  162022                  CLR     DONE             ;CLEAR INTERRUPT FLAG
020764  005767  162130                  TST     TEMP1            ;CHECK IF SPECIAL SEEK FLAG SET
020770  001050                          BNE     65$              ;YES - SKIP, DO NOT START SEEK
020772  014562  000004                  MOV     -(R5),RLDA(R2)   ;LOAD RL REGISTERS
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020776  014562  00C002                  MOV     -(R5),RLBA(R2)
021002  014562  000000                  MOV     -(R5),RLCS(R2)  ;PERFORM SEEK OPERATION
021006                          30$:    WAITUS  1               ;ALLOW TIME FOR RECEIPT OF SEEK COMMAND
021006  012727  000001                  MOV     #1,(PC)+
021012  000000                          .WORD   0
021014  016727  161076                  MOV     L$DLY,(PC)+
021020  000000                          .WORD   0
021022  005367  177772                  DEC     -6(PC)
021026  001375                          BNE     .-4
021030  005367  177756                  DEC     -22(PC)
021034  001367                          BNE     .-20
021036  005767  161744                  TST     DONE            ;TEST IF INTERRUPT DONE
021042  001012                          BNE     32$             ;YES - SKIP
021044  004767  175566                  JSR     PC,WAITIN       ;GO WAIT FOR INTERRUPT
021050  012603                          MOV     (SP)+,R3        ;GET RESULT MESSAGE POINTER
021052                                  ERRHRD  10005.,,ERR1
021052  104456                          TRAP    C$ERHRD
021054  023425                          .WORD   10005
021056  00000C                          .WORD   0
021060  012464                          .WORD   ERR1
021062  005067  161730                  CLR     ERRSWI          ;CLEAR FOR ERROR RETURN
021066  000411                          BR      65$
021070  005767  161750          32$:    TST     T.CS            ;TEST IF ANY ERROR
021074  100006                          BPL     65$             ;NO - SKIP
021076                                  ERRHRD  10006.,,ERR6
021076  104456                          TRAP    C$ERHRD
021100  023426                          .WORD   10006
021102  000000                          .WORD   0
021104  012766                          .WORD   ERR6
021106  005067  161704                  CLR     ERRSWI          ;CLEAR FOR ERROR RETURN
021112  162767  000002  161662  65$:    SUB     #2,SSINDX       ;REMOVE ENTRY FROM SUBROUTINE STACK
021120  012605                          MOV     (SP)+,R5        ;RESTORE REGISTER
021122  012601                          MOV     (SP)+,R1
021124  012600                          MOV     (SP)+,R0
021126  012603                          MOV     (SP)+,R3        ;RESTORE R3
021130  005767  161662                  TST     ERRSWI          ;TEST IF ERROR RETURN
021134  001403                          BEQ     99$             ;YES - SKIP
021136  066716  161654                  ADD     ERRSWI,(SP)     ;ADD IN ERROR RETURN
021142  000207                          RTS     PC
021144  017616  000000          99$:    MOV     @(SP),(SP)      ;SET ERROR RETURN ADDRESS
021150  000207                          RTS     PC



021152  010346                  SIMSEK: MOV     R3,-(SP)        ;STORE REGISTERS
021154  016703  161622                  MOV     SSINDX,R3       ;GET SUBROUTINE INDEX
021160  005723                          TST     (R3)+           ;BUMP IT FOR NEXT ENTRY
021162  016663  000002  002404          MOV     2(SP),SUBSTK(R3) ;INSERT THIS CALL
021170  162763  000004  002404          SUB     #4,SUBSTK(R3)   ;ADJUST IT TO CALLING LOCATION
021176  010367  161600                  MOV     R3,SSINDX       ;STORE IT BACK
021202  010046                          MOV     R0,-(SP)
021204  010446                          MOV     R4,-(SP)
021206  012767  000002  161602          MOV     #2,ERRSWI       ;SET FOR NO ERROR RETURN
021214  004767  000242                  JSR     PC,RDYCHK       ;CHECK IF DRIVE READY
021220  021424                          65$
021222  012704  003034                  MOV     #L.CS,R4        ;GET POINTER TO L REGS
021226  012714  000106                  MOV     #SEEK,(R4)      ;SET FOR SEEK
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 356 021232  056714  161574                  BIS     RLDRV,(R4)         ;INSERT DRIVE NUMBER
 357 021236  042724  002000                  BIC     #BIT10,(R4)+       ;CLEAR FOR DRIVE 4 - 7 SPEC'D
 358 021242  005024                          CLR     (R4)+              ;CLEAR BUS ADDRESS
 359 021244  016714  161636                  MOV     DESDIF,(R4)        ;LOAD DIFFERENCE
 360 021250  012703  000007                  MOV     #7,R3              ;SET COUNT FOR SHIFT TO ALIGN
 361 021254  006314                  3$:     ASL     (R4)               ;ALIGN DIFFERENCE IN DA
 362 021256  005303                          DEC     R3
 363 021260  001375                          BNE     3$
 364 021262  005767  161622                  TST     DESSGN             ;TEST IF SIGN SET
 365 021266  001402                          BEQ     5$                 ;NO - SKIP
 366 021270  052714  000004                  BIS     #DIRBIT,(R4)       ;INSERT SIGN
 367 021274  005767  161612          5$:     TST     DESHD              ;TEST IF HEAD 0
 368 021300  001402                          BEQ     7$                 ;YES - SKIP
 369 021302  052714  000020                  BIS     #HDSEL,(R4)        ;INSERT HEAD BIT
 370 021306  052724  000001          7$:     BIS     #MBSET0,(R4)+      ;INSERT MARKER BIT
 371 021312  005067  161470                  CLR     DONE               ;CLEAR INTERRUPT FLAG
 372 021316  012701  000012                  MOV     #10.,R1            ;SET WAIT COUNT FOR 800US
 373 021322  014462  000004                  MOV     -(R4),RLDA(R2)     ;LOAD RL REGISTERS
 374 021326  014462  000002                  MOV     -(R4),RLBA(R2)
 375 021332  014462  000000                  MOV     -(R4),RLCS(R2)
 376 021336  005767  161444          10$:    TST     DONE               ;CHECK IF INTERRUPTED
 377 021342  001030                          BNE     65$                ;YES - SKIP
 378 021344  005301                          DEC     R1                 ;DEC WAIT COUNT
 379 021346  001415                          BEQ     13$                ;IF 0 - SKIP
 380 021350                                  WAITUS  1
     021350  012727  000001                  MOV     #1,(PC)+
     021354  000000                          .WORD   0
     021356  016727  160534                  MOV     L$DLY,(PC)+
     021362  000000                          .WORD   0
     021364  005367  177772                  DEC     -6(PC)
     021370  001375                          BNE     .-4
     021372  005367  177756                  DEC     -22(PC)
     021376  001367                          BNE     .-20
 381 021400  000756                          BR      10$                ;GO CHECK DONE
 382 021402  004767  175230          13$:    JSR     PC,WAITIN          ;GO WAIT FOR TIMEOUT
 383 021406  012603                          MOV     (SP)+,R3           ;GET RESULT MESSAGE POINTER
 384 021410                                  ERRHRD  10011,,ERR1
     021410  104456                          TRAP    C$ERHRD
     021412  023433                          .WORD   10011
     021414  000000                          .WORD   0
     021416  012464                          .WORD   ERR1
 385 021420  005067  161372                  CLR     ERRSWI             ;CLEAR FOR ERROR RETURN
 386 021424                          14$:
 387 021424  162767  000002  161350  65$:    SUB     #2,SSINDX          ;REMOVE ENTRY FROM SUBROUT STACK
 388 021432  012604                          MOV     (SP)+,R4           ;RESTORE REGS
 389 021434  012600                          MOV     (SP)+,R0
 390 021436  012603                          MOV     (SP)+,R3
 391 021440  005767  161352                  TST     ERRSWI             ;TEST IF ERROR RETURN
 392 021444  001403                          BEQ     99$                ;YES - SKIP
 393 021446  066716  161344                  ADD     ERRSWI,(SP)        ;ADD IN ERROR RETURN
 394 021452  000207                          RTS     PC
 395 021454  017616  000000          99$:    MOV     @(SP),(SP)         ;SET ERROR RETURN ADDRESS
 396 021460  000207                          RTS     PC
 398
 474
 475
 476                                 ;       DRIVE READY TEST ROUTINE. CHECKS DRIVE IS READY. IF NOT, WAIT
```

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                                          ;       500MS FOR READY TO SET.
021462  010346                            RDYCHK: MOV     R3,-(SP)           ;STORE REGS
021464  016703  161312                            MOV     SSINDX,R3          ;GET SUBROUTINE INDEX
021470  005723                                    TST     (R3)+              ;BUMP IT FOR NEXT ENTRY
021472  016663  000002  002404                    MOV     2(SP),SUBSTK(R3)   ;INSERT THIS CALL
021500  162763  000004  002404                    SUB     #4,SUBSTK(R3)      ;ADJUST IT TO CALLING LOCATION
021506  010367  161270                            MOV     R3,SSINDX          ;STORE IT BACK
021512  010046                                    MOV     R0,-(SP)
021514  010146                                    MOV     R1,-(SP)
021516  010446                                    MOV     R4,-(SP)
021520  012767  000002  161270                    MOV     #2,ERRSWI          ;SET FOR NO ERROR RETURN
021526  012701  011610                            MOV     #5000.,R1          ;SET WAIT COUNT
021532  004767  175340            1$:             JSR     PC,GSTAT           ;GET DRIVE STATUS
021536  021754                                    4$
021540  032767  000001  161276                    BIT     #DRDYMSK,T.CS      ;TEST IF DRIVE READY
021546  001104                                    BNE     5$                 ;YES - EXIT
021550                                            WAITUS  1
021550  012727  000001                            MOV     #1,(PC)+
021554  000000                                    .WORD   0
021556  016727  160334                            MOV     L$DLY,(PC)+
021562  000000                                    .WORD   0
021564  005367  177772                            DEC     -6(PC)
021570  001375                                    BNE     .-4
021572  005367  177756                            DEC     -22(PC)
021576  001367                                    BNE     .-20
021600  005301                                    DEC     R1                 ;DEC WAIT COUNT
021602  001353                                    BNE     1$                 ;LOOP IF NOT 0
021604  012703  010404                            MOV     #MDRDY,R3          ;SET RESULT MESSAGE POINTER
021610  012704  011404                            MOV     #C500MS,R4         ;SET CONDITION MESSAGE POINTER
021614                                            ERRHRD  10010.,,ERR5
021614  104456                                    TRAP    C$ERHRD
021616  023432                                    .WORD   10010
021620  000000                                    .WORD   0
021622  012716                                    .WORD   ERR5
021624  012701  000030                            MOV     #24.,R1            ;INITIALIZE WAIT COUNT
021630  004767  175242            2$:             JSR     PC,GSTAT           ;GET DRIVE STATUS
021634  021754                                    4$
021636  032767  000001  161200                    BIT     #DRDYMSK,T.CS      ;TEST IF DRIVE READY
021644  001031                                    BNE     3$                 ;YES - SKIP
021646                                            WAITMS  1                  ;WAIT FOR 100MS
021664  012727  000372                            MOV     #250.,(PC)+
021670  000000                                    .WORD   0
021672  016727  160220                            MOV     L$DLY,(PC)+
021676  000000                                    .WORD   0
021700  005367  177772                            DEC     -6(PC)
021704  001375                                    BNE     .-4
021706  005367  177756                            DEC     -22(PC)
021712  001367                                    BNE     .-20
021714  104422                                    TRAP    C$BRK
021724  005301                                    DEC     R1                 ;DEC WAIT COUNTER
021726  001340                                    BNE     2$                 ;LOOP UNTIL TIME DONE
021730  032767  100000  161106    3$:             BIT     #ANYERR,T.CS       ;TEST IF ANYERR SET
021736  001406                                    BEQ     4$                 ;NO - SKIP
021740                                            ERRHRD  10011.,,ERR6       ;REPORT ALL ERRORS
021740  104456                                    TRAP    C$ERHRD
021742  023433                                    .WORD   10011
021744  000000                                    .WORD   0
```

```
021746  012766                            .WORD   ERR6
021750  005367  161204                    DEC     ERRCNT          ;REDUCE ERROR COUNT FOR DUAL ERRORS
021754  005067  161036            4$:     CLR     ERRSWI          ;CLEAR FOR ERROR RETURN
021760  162767  000002  161014    5$:     SUB     #2,SSINDX       ;REMOVE ENTRY FROM SUBROUT STACK
021766  012604                            MOV     (SP)+,R4        ;RESTORE REGS
021770  012601                            MOV     (SP)+,R1
021772  012600                            MOV     (SP)+,R0
021774  012603                            MOV     (SP)+,R3
021776  005767  161014                    TST     ERRSWI          ;TEST IF ERROR RETURN
022002  001403                            BEQ     99$             ;YES - SKIP
022004  066716  161006                    ADD     ERRSWI,(SP)     ;ADD IN ERROR RETURN
022010  000207                            RTS     PC
022012  017616  000000            99$:    MOV     @(SP),(SP)      ;SET ERROR RETURN ADDRESS
022016  000207                            RTS     PC

                                  ;       CHOOSE HEAD ROUTINE. PICKS HEAD 0 UNLESS SPECIFIC HEAD IS
                                  ;       SELECTED BY SOFTWARE PARAMETER.
022020  005067  161066            CHOSHD: CLR     DESHD           ;CLEAR TO HEAD 0
022024  032767  010000  172274            BIT     #HEADLM,MISWIW  ;TEST IF HEAD SPECIF!ED
022032  001403                            BEQ     1$              ;NO - SKIP
022034  016767  172274  161050            MOV     HEADW,DESHD     ;INSERT SPECIFIED HEAD
022042  000207                    1$:     RTS     PC



                                  ;       SWAP HEAD ROUTINE. CHANGES SELECTED HEAD TO HEAD 1
                                  ;       UNLESS HEAD 0 SPECIFICALLY SELECTED BY SOFTWARE PARAMETER.
022044  032767  010000  172254    SWAPHD: BIT     #HEADLM,MISWIW  ;TEST IF HEAD SPECIFIED
022052  001011                            BNE     2$              ;YES - TAKE ABORT EXIT
022054  005767  161032                    TST     DESHD           ;TEST IF HEAD ONE USED
022060  001006                            BNE     2$              ;YES - TAKE ABORT EXIT
022062  012767  000001  161022            MOV     #1,DESHD        ;ELSE SET FOR HEAD ONE
022070  062716  000002                    ADD     #2,(SP)         ;BUMP PAST ABORT RETURN
022074  000207                            RTS     PC              ;RETURN
022076  017616  000000            2$:     MOV     @(SP),(SP)      ;GET ABORT DESTINATION
022102  000207                    3$:     RTS     PC



                                  ;       SWAP OLD CYLINDER AND NEW CYLINDER ROUTINE.
022104  010046                    ONSWAP: MOV     R0,-(SP)        ;STORE R0
022106  016700  160766                    MOV     OLDCYL,R0       ;MOVE OLD TO R0
022112  016767  160764  160760            MOV     NEWCYL,OLDCYL   ;MOVE NEW TO OLD
022120  010067  160756                    MOV     R0,NEWCYL       ;PUT OLD IN NEW
022124  012600                            MOV     (SP)+,R0        ;RESTORE R0
022126  000207                            RTS     PC



                                  ;       READ HEADERS ROUTINE.
022130  012767  000001  160770    XRDHDC: MOV     #1,TEMP4        ;SET FLAG TO BYPASS REG STORAGE
022136  000402                            BR      XRDHDG          ;GO DO IT
022140  005067  160762            XRDHD:  CLR     TEMP4           ;SET FLAG TO SAVE T. AND L. REGS
022144  010346                    XRDHDG: MOV     R3,-(SP)        ;STORE REGISTERS
022146  016703  160630                    MOV     SSINDX,R3       ;GET SUBROUTINE INDEX
022152  005723                            TST     (R3)+           ;BUMP IT FOR NEXT ENTRY
022154  016663  000002  002404            MOV     2(SP),SUBSTK(R3) ;INSERT THIS CALL
```

```
022162  162763  000004  002404          SUB     #4,SUBSTK(R3)     ;ADJUST IT TO CALLING LOCATION
022170  010367  160606                  MOV     R3,SSINDX         ;STORE IT BACK
022174  010046                          MOV     R0,-(SP)
022176  010146                          MOV     R1,-(SP)
022200  010446                          MOV     R4,-(SP)
022202  012767  000002  160606          MOV     #2,ERRSWI         ;SET FOR NO ERROR RETURN
022210  005767  160712                  TST     TEMP4             ;TEST IF REGISTERS TO BE SAVED
022214  001007                          BNE     2$                ;NO - SKIP
022216  012703  003044                  MOV     #L.MP+2,R3        ;SET POINTER FOR REGS
022222  012701  000004                  MOV     #4,R1             ;SET COUNT
022226  014346                  1$:     MOV     -(R3),-(SP)       ;SAVE REGISTER
022230  005301                          DEC     R1                ;DEC COUNT
022232  001375                          BNE     1$                ;LOOP UNTIL ALL ARE SAVED
022234  004767  177222          2$:     JSR     PC,RDYCHK         ;CHECK DRIVE READY
022240  022526                          65$
022242  005067  160540                  CLR     DONE              ;CLEAR INTERRUPT FLAG
022246  012701  003034                  MOV     #L.CS,R1          ;GET ADDRESS OF LOAD REGS
022252  016711  160554                  MOV     RLDRV,(R1)        ;LOAD DRIVE NUMBER
022256  042711  002000                  BIC     #BIT10,(R1)       ;CLEAR FOR DRIVE 4 - 7 SPEC'D
022262  052721  000110                  BIS     #RDHEAD,(R1)+     ;INSERT COMMAND
022266  005021                          CLR     (R1)+             ;CLEAR BA
022270  005021                          CLR     (R1)+             ;CLEAR DA
022272  014162  000004                  MOV     -(R1),RLDA(R2)    ;LOAD RL11 REGS
022276  014162  000002                  MOV     -(R1),RLBA(R2)
022302  014162  000000                  MOV     -(R1),RLCSR(R2)
022306                          3$:     WAITUS  10.               ;WAIT 1 MS FOR INTERRUPT
022306  012727  000012                  MOV     #10.,(PC)+
022312  000000                          .WORD   0
022314  016727  157576                  MOV     L$DLY,(PC)+
022320  000000                          .WORD   0
022322  005367  177772                  DEC     -6(PC)
022326  001375                          BNE     .-4
022330  005367  177756                  DEC     -22(PC)
022334  001367                          BNE     .-20
022336  005767  160444                  TST     DONE              ;TEST IF INTERRUPT FLAG SET
022342  001460                          BEQ     14$               ;NO - SKIP
022344  032767  000001  160472  5$:     BIT     #DRDYMSK,T.CS     ;TEST IF DRIVE READY
022352  001035                          BNE     10$               ;YES - SKIP
022354  012703  010404                  MOV     #MDRDY,R3         ;SET NO READY MESSAGE
022360  012704  011423                  MOV     #CAFDT,R4         ;CONDITION OF AFTER DATA XFER
022364                                  ERRHRD  10017.,,ERR5
022364  104456                          TRAP    C$ERHRD
022366  023441                          .WORD   10017
022370  000000                          .WORD   0
022372  012716                          .WORD   ERR5
022374  012701  000030                  MOV     #24.,R1           ;INITIALIZE WAIT COUNT
022400  004767  174472          4$:     JSR     PC,GSTAT          ;GET STATUS
022404  022522                          60$
022406  032767  000001  160430          BIT     #DRDYMSK,T.CS     ;TEST IF DRIVE HAS COME READY
022414  001403                          BEQ     11$               ;NO - SKIP
022416  005067  160374                  CLR     ERRSWI            ;CLEAR ERROR SWITCH
022422  000411                          BR      10$               ;SKIP
022424  005301                  11$:    DEC     R1                ;DEC WAIT COUNT
022426  001364                          BNE     4$                ;LOOP UNTIL TIME DONE
022430  012704  011434                  MOV     #C5SEC,R4         ;SET CONDITION AFTER 5 SECONDS
022434                                  ERRHRD  10014.,,ERR5
022434  104456                          TRAP    C$ERHRD
```

```
022436  023436                                  .WORD   10014
022440  000000                                  .WORD   0
022442  012716                                  .WORD   ERR5
022444  000426                                  BR      60$                     ;EXIT
022446  005767  160372                  10$:    TST     T.CS                    ;CHECK FOR ANY ERRORS
022452  100005                                  BPL     12$                     ;NO - SKIP
022454                                          ERRHRD  10016.,,ERR6            ;REPORT ALL ERRORS
022454  104456                                  TRAP    C$ERHRD
022456  023440                                  .WORD   10016
022460  000000                                  .WORD   0
022462  012766                                  .WORD   ERR6
022464  000416                                  BR      60$
022466  012701  003054                  12$:    MOV     #HDWRD2,R1              ;GET POINTER
022472  016221  000006                          MOV     RLMP(R2),(R1)+          ;STORE LAST TWO HEADER WORDS
022476  016221  000006                          MOV     RLMP(R2),(R1)+
022502  000411                                  BR      65$                     ;EXIT
022504  004767  174126                  14$:    JSR     PC,WAITIN               ;WAIT FOR INTERRUPT
022510  012603                                  MOV     (SP)+,R3                ;GET RESULTS
022512                                          ERRHRD  10015.,,ERR1            ;REPORT
022512  104456                                  TRAP    C$ERHRD
022514  023437                                  .WORD   10015
022516  000000                                  .WORD   0
022520  012464                                  .WORD   ERR1
022522  005067  160270                  60$:    CLR     ERRSWI                  ;CLEAR FOR ERROR RETURN
022526  005767  160374                  65$:    TST     TEMP4                   ;TEST IF REGISTERS WERE SAVED
022532  001007                                  BNE     22$                     ;NO - SKIP
022534  012703  003034                          MOV     #L.CS,R3                ;SET POINTER TO RESTORE REGS
022540  012701  000004                          MOV     #4,R1                   ;SET COUNT
022544  012623                          20$:    MOV     (SP)+,(R3)+             ;RESTORE REGISTER
022546  005301                                  DEC     R1                      ;DEC COUNT
022550  001375                                  BNE     20$                     ;LOOP UNTIL ALL ARE RESTORED
022552  162767  000002  160222          22$:    SUB     #2.SSINDX               ;REMOVE ENTRY FROM SUBROUT STACK
022560  012604                                  MOV     (SP)+,R4                ;RESTORE REGS
022562  012601                                  MOV     (SP)+,R1
022564  012600                                  MOV     (SP)+,R0
022566  012603                                  MOV     (SP)+,R3
022570  005767  160222                          TST     ERRSWI                  ;TEST IF ERROR RETURN
022574  001403                                  BEQ     99$                     ;YES - SKIP
022576  066716  160214                          ADD     ERRSWI,(SP)             ;ADD IN ERROR RETURN
022602  000207                                  RTS     PC
022604  017616  000000                  99$:    MOV     @(SP),(SP)              ;SET ERROR RETURN ADDRESS
022610  000207                                  RTS     PC



                                        ;       POSITION HEAD BIT FROM HEADER OR MULTIPURPOSE REGISTER TO LSB.
022612  016705  160234                  POSHW1: MOV     HDWRD1,R5               ;START FOR POSITION HD BIT IN WD 1
022616  000402                                  BR      POSHD0                  ;SKIP
022620  016705  160226                  POSHSB: MOV     T.MP,R5                 ;START FOR POSITION HD BIT IN MP
022624  010146                          POSHD0: MOV     R1,-(SP)                ;STORE R1
022626  042705  177677                          BIC     #^CHSSTAT,R5            ;CLEAR ALL BUT HEAD SEL BIT
022632  012701  000006                          MOV     #6,R1                   ;SET SHIFT COUNT
022636  006205                          1$:     ASR     R5                      ;SHIFT FOR RIGHT JUSTIFY
022640  005301                                  DEC     R1
022642  001375                                  BNE     1$
022644  012601                                  MOV     (SP)+,R1                ;RESTORE R1
022646  000207                                  RTS     PC                      ;RETURN
```

```
    745
    746
    747
    748                                       ;       WAIT FOR READY ROUTINE. DURATION OF WAIT PASSED TO THE ROUTINE
    749                                       ;       FROM THE CALLING ROUTINE IN R1.
    750 022650  010346                        RDYWAIT:        MOV     R3,-(SP)        ;STORE R3
    751 022652  016703  160124                        MOV     SSINDX,R3               ;GET SUBROUTINE INDEX
    752 022656  005723                                TST     (R3)+                   ;BUMP IT FOR NEXT ENTRY
    753 022660  016663  000002  002404                MOV     2(SP),SUBSTK(R3)        ;INSERT THIS CALL
    754 022666  162763  000004  002404                SUB     #4,SUBSTK(R3)           ;ADJUST IT TO CALLING LOCATION
    755 022674  010367  160102                        MOV     R3,SSINDX               ;STORE IT BACK
    756 022700  010046                                MOV     R0,-(SP)
    757 022702  010146                                MOV     R1,-(SP)
    758 022704  010446                                MOV     R4,-(SP)
    759 022706  012767  000002  160102                MOV     #2,ERRSWI               ;SET FOR NO ERROR RETURN
    760
    761 022714                                5$:     BREAK                           ;ALLOW A ^C
        022714  104422                                TRAP    C$BRK
    762 022716  004767  174154                        JSR     PC,GSTAT                ;GET DRIVE STATUS
    763 022722  023156                                10$
    764 022724  032767  000001  160112                BIT     #DRDYMSK,T.CS           ;CHECK IF READY
    765 022732  001113                                BNE     9$                      ;YES - SKIP
    766 022734  005301                                DEC     R1                      ;DEC WAIT COUNT
    767 022736  001415                                BEQ     7$                      ;SKIP IF 0
    768 022740                                        WAITUS  1
        022740  012727  000001                        MOV     #1,(PC)+
        022744  000000                                .WORD   0
        022746  016727  157144                        MOV     L$DLY,(PC)+
        022752  000000                                .WORD   0
        022754  005367  177772                        DEC     -6(PC)
        022760  001375                                BNE     .-4
        022762  005367  177756                        DEC     -22(PC)
        022766  001367                                BNE     .-20
    769 022770  000751                                BR      5$
    770 022772  012703  010404                7$:     MOV     #MDRDY,R3               ;SET NAME MESSAGE PTR
    771 022776                                        ERRHRD  10020.,,ERR3            ;REPORT READY ERROR
        022776  104456                                TRAP    C$ERHRD
        023000  023444                                .WORD   10020
        023002  000000                                .WORD   0
        023004  012600                                .WORD   ERR3
    772 023006  012701  000030                        MOV     #24.,R1                 ;INITIALIZE WAIT COUNT
    773
    774 023012                                6$:     BREAK                           ;ALLOW A ^C
        023012  104422                                TRAP    C$BRK
    775 023014  004767  174056                        JSR     PC,GSTAT                ;GET DRIVE STATUS
    776 023020  023156                                10$
    777 023022  032767  000001  160014                BIT     #DRDYMSK,T.CS           ;TEST IF DRIVE READY
    778 023030  001040                                BNE     8$                      ;YES - SKIP
    779 023032                                        WAITMS  1                       ;WAIT 100 MS
        023050  012727  000372                        MOV     #250.,(PC)+
        023054  000000                                .WORD   0
        023056  016727  157034                        MOV     L$DLY,(PC)+
        023062  000000                                .WORD   0
        023064  005367  177772                        DEC     -6(PC)
        023070  001375                                BNE     .-4
        023072  005367  177756                        DEC     -22(PC)
        023076  001367                                BNE     .-20
```

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023100  104422                          TRAP    C$BRK
023110  005301                          DEC     R1                      ;DEC WAIT COUNT
023112  001337                          BNE     6$                      ;LOOP UNTIL TIME DONE
023114  012704  011434                  MOV     #C5SEC,R4               ;SET CONDITION AFTER 5 SECDS
023120                                  ERRHRD  10021.,,ERR5
023120  104456                          TRAP    C$ERHRD
023122  023445                          .WORD   10021
023124  000000                          .WORD   0
023126  012716                          .WORD   ERR5
023130  000410                          BR      11$                     ;EXIT
023132  032767  100000  157704  8$:     BIT     #ANYERR,T.CS            ;TEST IF ANY ERROR SET
023140  001406                          BEQ     10$                     ;NO - SKIP
023142                                  ERRHRD  10022.,,ERR6            ;REPORT ALL ERRORS
023142  104456                          TRAP    C$ERHRD
023144  023446                          .WORD   10022
023146  000000                          .WORD   0
023150  012766                          .WORD   ERR6
023152  005367  160002          11$:    DEC     ERRCNT                  ;DECREMENT FOR DOUBLE ERROR REPORT
023156  005067  157634          10$:    CLR     ERRSWI                  ;CLEAR FOR ERROR ERROR RETURN
023162  162767  000002  157612  9$:     SUB     #2,SSINDX               ;REMOVE ENTRY FROM SUBROUT STACK
023170  012604                          MOV     (SP)+,R4                ;RESTORE REGISTERS
023172  012601                          MOV     (SP)+,R1
023174  012600                          MOV     (SP)+,R0
023176  012603                          MOV     (SP)+,R3                ;RESTORE R3
023200  005767  157612                  TST     ERRSWI                  ;TEST IF ERROR RETURN
023204  001403                          BEQ     99$                     ;YES - SKIP
023206  066716  157604                  ADD     ERRSWI,(SP)             ;ADD IN ERROR RETURN
023212  000207                          RTS     PC
023214  017616  000000          99$:    MOV     @(SP),(SP)              ;SET ERROR RETURN ADDRESS
023220  000207                          RTS     PC



                                ;       GET POSITION ROUTINE. READS A HEADER FROM CURRENT CYLINDER
                                ;       (WHERE IT IS PRESENTLY POSITIONED) AND STORES CYLINDER
                                ;       NUMBER IN CURCYL.
023222  010346                  GETPOS: MOV     R3,-(SP)                ;STORE REGISTERS
023224  016703  157552                  MOV     SSINDX,R3               ;GET SUBROUTINE INDEX
023230  005723                          TST     (R3)+                   ;BUMP IT FOR NEXT ENTRY
023232  016663  000002  002404          MOV     2(SP),SUBSTK(R3)        ;INSERT THIS CALL
023240  162763  000004  002404          SUB     #4,SUBSTK(R3)           ;ADJUST IT TO CALLING LOCATION
023246  010367  157530                  MOV     R3,SSINDX               ;STORE IT BACK
023252  010046                          MOV     R0,-(SP)
023254  010546                          MOV     R5,-(SP)
023256  004767  176656                  JSR     PC,XRDHD                ;DO READ HEADER
023262  023312                          65$
023264  016703  157562                  MOV     HDWRD1,R3               ;GET HEADER WORD
023270  012705  000007                  MOV     #7,R5                   ;SET SHIFT COUNT
023274  006203                  4$:     ASR     R3                      ;SHIFT TO RIGHT JUSTIFY
023276  005305                          DEC     R5
023300  001375                          BNE     4$
023302  042703  177000                  BIC     #177000,R3
023306  010367  157572                  MOV     R3,CURCYL               ;STORE AS CURRENT CYLINDER
023312  162767  000002  157462  65$:    SUB     #2,SSINDX               ;REMOVE ENTRY FROM SUBROUT STACK
023320  012605                          MOV     (SP)+,R5                ;RESTORE REGISTERS
023322  012600                          MOV     (SP)+,R0
023324  012603                          MOV     (SP)+,R3
```

```
828 023326  005767  157464                  TST     ERRSWI              ;TEST IF ERROR RETURN
829 023332  001403                          BEQ     99$                 ;YES - SKIP
830 023334  066716  157456                  ADD     ERRSWI,(SP)         ;ADD IN ERROR RETURN
831 023340  000207                          RTS     PC
832 023342  017616  000000          99$:    MOV     @(SP),(SP)          ;SET ERROR RETURN ADDRESS
833 023346  000207                          RTS     PC
834
863
864
865                                 ;       READ ALL HEADERS ROUTINE. 40 HEADERS ARE READ AND STORED
866                                 ;       IN IBUFF.
867 023350  010346                  RDALHD: MOV     R3,-(SP)            ;STORE REGISTERS
868 023352  016703  157424                  MOV     SSINDX,R3           ;GET SUBROUTINE INDEX
869 023356  005723                          TST     (R3)+               ;BUMP IT FOR NEXT ENTRY
870 023360  016663  000002  002404          MOV     2(SP),SUBSTK(R3)    ;INSERT THIS CALL
871 023366  162763  000004  002404          SUB     #4,SUBSTK(R3)       ;ADJUST IT TO CALLING LOCATION
872 023374  010367  157402                  MOV     R3,SSINDX           ;STORE IT BACK
873 023400  010046                          MOV     R0,-(SP)
874 023402  010146                          MOV     R1,-(SP)
875 023404  010446                          MOV     R4,-(SP)
876 023406  012767  000002  157402          MOV     #2,ERRSWI           ;SET FOR NO ERROR RETURN
877 023414  012701  000050                  MOV     #40.,R1             ;SET HEADER COUNT
878 023420  052767  100000  157356          BIS     #HDR40,OPFLAG       ;SET 40 HDR OP FLAG
879 023426  012703  003764                  MOV     #IBUFF,R3           ;SET POINTER TO STORE HDRS
880 023432  016704  157370                  MOV     RLBAS,R4            ;GET BASE ADDRESS
881 023436  062704  000006                  ADD     #RLMP,R4            ;MAKE IT POINT TO MP REG
882 023442  012767  000010  157364          MOV     #10,L.CS            ;LOAD FOR READ HEADER, NO INTERRUPT
883 023450  056767  157356  157356          BIS     RLDRV,L.CS          ;INSERT DRIVE NUMBER
884 023456  042767  002000  157350          BIC     #BIT10,L.CS         ;CLEAR FOR DRIVE 4 - 7 SPEC'D
885 023464  005067  157346                  CLR     L.BA                ;CLEAR BA
886 023470  005067  157344                  CLR     L.DA                ;CLEAR DA
887 023474  005767  157412                  TST     DESHD               ;TEST IF HEAD 0
888 023500  001403                          BEQ     3$                  ;YES - SKIP
889 023502  052767  000020  157330          BIS     #HDSEL,L.DA         ;ELSE INSERT HEAD 0
890 023510  016762  157324  000004  3$:     MOV     L.DA,RLDA(R2)       ;LOAD RLDA REG
891 023516  016762  157314  000002          MOV     L.BA,RLBA(R2)       ;LOAD RLBA
892 023524  032762  000200  000000          BIT     #CRDYMSK,RLCS(R2)           ;TEST IF CONTROLLER READY
893 023532  001003                          BNE     6$                  ;YES - SKIP
894 023534  004767  175722                  JSR     PC,RDYCHK           ;ELSE CHECK READY
895 023540  023656                                  65$
896 023542  016762  157266  000000  6$:     MOV     L.CS,RLCS(R2)       ;LOAD RLCS REG
897 023550  012700  077777                  MOV     #77777,R0           ;SET COUNT FOR WAIT
898 023554  032762  000200  000000  7$:     BIT     #CRDYMSK,RLCS(R2)  ;CHECK THAT OPERATION COMPLETED
899 023562  001016                          BNE     8$                  ;YES - SKIP
900 023564  005300                          DEC     R0                  ;DEC COUNT
901 023566  001372                          BNE     7$                  ;SKIP IF NOT YET 0
902 023570  004767  173010                  JSR     PC,READRL           ;ELSE GET ALL REGISTERS
903 023574  004767  173036                  JSR     PC,WAITIN           ;ELSE WAIT FOR TIMEOUT
904 023600  012603                          MOV     (SP)+,R3            ;GET RESULT MESSAGE POINTER
905 023602                                  ERRHRD  10025.,,ERR1
    023602  104456                          TRAP    C$ERHRD
    023604  023451                          .WORD   10025
    023606  000000                          .WORD   0
    023610  012464                          .WORD   ERR1
906 023612  005067  157200                  CLR     ERRSWI              ;CLEAR FOR ERROR RETURN
907 023616  000417                          BR      65$
908 023620  005767  157220          8$:     TST     T.CS                ;TEST FOR ANY ERRORS
```

```
 909 023624  100007                          BPL     12$              ;NO - SKIP
 910 023626                                  ERRHRD  10026.,,ERR6
     023626  104456                          TRAP    C$ERHRD
     023630  023452                          .WORD   10026
     023632  000000                          .WORD   0
     023634  012766                          .WORD   ERR6
 911 023636  005067  157154                  CLR     ERRSWI           ;CLEAR FOR ERROR RETURN
 912 023642  000405                          BR      65$
 913 023644  011423                  12$:    MOV     (R4),(R3)+       ;STORE HEADER WORDS
 914 023646  011423                          MOV     (R4),(R3)+
 915 023650  011423                          MOV     (R4),(R3)+
 916 023652  005301                          DEC     R1               ;DEC HEADER COUNT
 917 023654  001332                          BNE     6$
 918 023656  162767  000002  157116  65$:    SUB     #2,SSINDX        ;REMOVE ENTRY FROM SUBROUT STACK
 919 023664  012604                          MOV     (SP)+,R4         ;RESTORE REGISTERS
 920 023666  012601                          MOV     (SP)+,R1
 921 023670  012600                          MOV     (SP)+,R0
 922 023672  012603                          MOV     (SP)+,R3
 923 023674  005767  157116                  TST     ERRSWI           ;TEST IF ERROR RETURN
 924 023700  001403                          BEQ     99$              ;YES - SKIP
 925 023702  066716  157110                  ADD     ERRSWI,(SP)      ;ADD IN ERROR RETURN
 926 023706  000207                          RTS     PC
 927 023710  017616  000000          99$:    MOV     @(SP),(SP)       ;SET ERROR RETURN ADDRESS
 928 023714  000207                          RTS     PC
 929
 930
1158
1159                                 ;       REPORT OPERATION ROUTINE. PRINTS SUBROUTINE TRACE SEQUENCE AND
1160                                 ;       OPERATION BEING PERFORMED PORTION OF ALL
1161                                 ;       ERROR MESSAGES.
1162 023716  010446                  RPTOP:  MOV     R4,-(SP)
1163 023720  005767  157056                  TST     SSINDX           ;TEST SUBROUTINE INDEX 0
1164 023724  001433                          BEQ     1$               ;SKIP IF 0
1165 023726  012704  000002                  MOV     #2,R4            ;SET INDEXER TO FIRST ENTRY
1166 023732                                  PRINTB  #FMT9,#SEQMES    ;PRINT "SUBROUTINE CALL SEQ"
     023732  012746  010253                  MOV     #SEQMES,-(SP)
     023736  012746  011753                  MOV     #FMT9,-(SP)
     023742  012746  000002                  MOV     #2,-(SP)
     023746  010600                          MOV     SP,R0
     023750  104414                          TRAP    C$PNTB
     023752  062706  000006                  ADD     #6,SP
1167 023756                          3$:     PRINTB  #FMT16,SUBSTK(R4)        ;PRINT CALLING LOCATION
     023756  016446  002404                  MOV     SUBSTK(R4),-(SP)
     023762  012746  012126                  MOV     #FMT16,-(SP)
     023766  012746  000002                  MOV     #2,-(SP)
     023772  010600                          MOV     SP,R0
     023774  104414                          TRAP    C$PNTB
     023776  062706  000006                  ADD     #6,SP
1168 024002  062704  000002                  ADD     #2,R4            ;BUMP INDEX
1169 024006  020467  156770                  CMP     R4,SSINDX        ;CHECK IF ALL PRINTED
1170 024012  003761                          BLE     3$               ;LOOP IF NOT ALL PRINTED YET
1171 024014                          1$:     PRINTB  #FMT4,ERHEAD,#TSTLAB     ;PRINT ERROR HEADER
     024014  012746  006365                  MOV     #TSTLAB,-(SP)
     024020  016746  156766                  MOV     ERHEAD,-(SP)
     024024  012746  011556                  MOV     #FMT4,-(SP)
     024030  012746  000003                  MOV     #3,-(SP)
     024034  010600                          MOV     SP,R0
```

```
      024036  104414                                TRAP    C$PNTB
      024040  062706  000010                        ADD     #10,SP
 1172 024044  042767  030000  156732                BIC     #SEEKOP!RORWOP,OPFLAG   ;CLEAR SK & RD OR WRT FLAG
 1173 024052  016701  156756                        MOV     L.CS,R1         ;GET COMMAND EXECUTED
 1174 024056  042701  177741                        BIC     #177741,R1      ;STRIP ALL BUT FUNCTION CODE
 1175 024062  022701  000006                        CMP     #6,R1   ;TEST IF SEEK OPERATION
 1176 024066  001003                                BNE     2$              ;NO - SKIP
 1177 024070  052767  010000  156706                BIS     #SEEKOP,OPFLAG  ;ELSE SET SEEK FLAG
 1178 024076  022701  000012          2$:           CMP     #12,R1          ;TEST IF WRITE
 1179 024102  001003                                BNE     20$             ;NO - SKIP
 1180 024104  052767  020000  156672                BIS     #RORWOP,OPFLAG  ;SET RD OR WRT FLAG
 1181 024112  022701  000014          20$:          CMP     #14,R1          ;TEST IF READ
 1182 024116  001003                                BNE     22$             ;NO - SKIP
 1183 024120  052767  020000  156656                BIS     #RORWOP,OPFLAG  ;SET RD OR WRT FLAG
 1184 024126                          22$:          PRINTB  #FMT1,#MOPER,OPMSGS(R1) ;PRINT OPERATION
      024126  016146  002224                        MOV     OPMSGS(R1),-(SP)
      024132  012746  005414                        MOV     #MOPER,-(SP)
      024136  012746  011534                        MOV     #FMT1,-(SP)
      024142  012746  000003                        MOV     #3,-(SP)
      024146  010600                                MOV     SP,R0
      024150  104414                                TRAP    C$PNTB
      024152  062706  000010                        ADD     #10,SP
 1185 024156  020127  000004                        CMP     R1,#4           ;CHECK IF GET STATUS
 1186 024162  001007                                BNE     4$              ;NO - SKIP
 1187 024164  032767  000010  156646                BIT     #DRSET,L.DA     ;TEST IF RESET INCLUDED
 1188 024172  001403                                BEQ     4$              ;NO - SKIP
 1189 024174  012701  000016                        MOV     #16,R1          ;SET TO PRINT WITH RESET
 1190 024200  000436                                BR      9$
 1191 024202  032767  007777  156574  4$:           BIT     #COMPOP,OPFLAG  ;TEST IF ANY OTHER OPERATION
 1192 024210  001424                                BEQ     8$              ;NO - SKIP
 1193 024212  016704  156566                        MOV     OPFLAG,R4       ;SET UP TO DETERMINE WHICH ONE
 1194 024216  012701  000020                        MOV     #20,R1          ;PRESET THE POINTER
 1195 024222  032704  000001          5$:           BIT     #BIT00,R4       ;CHECK THE BIT
 1196 024226  001003                                BNE     6$              ;IF SET - SKIP
 1197 024230  005721                                TST     (R1)+           ;BUMP POINTER
 1198 024232  006204                                ASR     R4
 1199 024234  000772                                BR      5$
 1200 024236                          6$:           PRINTB  #FMT2,OPMSGS(R1)
      024236  016146  002224                        MOV     OPMSGS(R1),-(SP)
      024242  012746  011550                        MOV     #FMT2,-(SP)
      024246  012746  000002                        MOV     #2,-(SP)
      024252  010600                                MOV     SP,R0
      024254  104414                                TRAP    C$PNTB
      024256  062706  000006                        ADD     #6,SP
 1201 024262  032767  100000  156514  8$:           BIT     #HDR40,OPFLAG   ;TEST IF 40 HEADER OPERATION
 1202 024270  001415                                BEQ     10$             ;NO - SKIP
 1203 024272  012701  000050                        MOV     #50,R1          ;ELSE PRINT IT
 1204 024276                          9$:           PRINTB  #FMT2,OPMSGS(R1)
      024276  016146  002224                        MOV     OPMSGS(R1),-(SP)
      024302  012746  011550                        MOV     #FMT2,-(SP)
      024306  012746  000002                        MOV     #2,-(SP)
      024312  010600                                MOV     SP,R0
      024314  104414                                TRAP    C$PNTB
      024316  062706  000006                        ADD     #6,SP
 1205 024322  000434                                BR      15$             ;SKIP
 1206 024324  032767  010000  156452  10$:          BIT     #SEEKOP,OPFLAG  ;TEST IF SEEK
 1207 024332  001430                                BEQ     15$             ;NO - SKIP
```

```
1208 024334                              PRINTB  #FMT13,#FRMWD,OLDCYL,#DIFWD,DESDIF,#SGNWD,DESSGN,#HDWD,DESHD
     024334  016746  156552              MOV     DESHD,-(SP)
     024340  012746  010214              MOV     #HDWD,-(SP)
     024344  016746  156540              MOV     DESSGN,-(SP)
     024350  012746  010207              MOV     #SGNWD,-(SP)
     024354  016746  156526              MOV     DESDIF,-(SP)
     024360  012746  010201              MOV     #DIFWD,-(SP)
     024364  016746  156510              MOV     OLDCYL,-(SP)
     024370  012746  010232              MOV     #FRMWD,-(SP)
     024374  012746  011774              MOV     #FMT13,-(SP)
     024400  012746  000011              MOV     #11,-(SP)
     024404  010600                      MOV     SP,R0
     024406  104414                      TRAP    C$PNTB
     024410  062706  000024              ADD     #24,SP
1209 024414  032767  020000  156362 15$: BIT     #RORWOP,OPFLAG  ;TEST IF READ OR WRITE SET
1210 024422  001424                      BEQ     17$             ;NO - SKIP
1211 024424                              PRINTB  #FMT22,#CYLWD,CURCYL,#HDWD,DESHD,#SECWD,DESSEC
     024424  016746  156464              MOV     DESSEC,-(SP)
     024430  012746  010220              MOV     #SECWD,-(SP)
     024434  016746  156452              MOV     DESHD,-(SP)
     024440  012746  010214              MOV     #HDWD,-(SP)
     024444  016746  156434              MOV     CURCYL,-(SP)
     024450  012746  010225              MOV     #CYLWD,-(SP)
     024454  012746  012323              MOV     #FMT22,-(SP)
     024460  012746  000007              MOV     #7,-(SP)
     024464  010600                      MOV     SP,R0
     024466  104414                      TRAP    C$PNTB
     024470  062706  000020              ADD     #20,SP
1212 024474  004767  000446         17$: JSR     PC,CLRPARM      ;CLEAR PARAM TABLE
1213 024500  012604                      MOV     (SP)+,R4        ;RESTORE R4
1214 024502  000207                      RTS     PC
1215
1216
1217
1218                                ;        REPORT REASON ROUTINE
1219                                ;        PRINTS REASON PORTION FOR ALL ERROR REPORTS.
1220 024504  010146                RPTRES: MOV     R1,-(SP)        ;STORE R1
1221 024506  010346                        MOV     R3,-(SP)        ;STORE R3
1222 024510  010446                        MOV     R4,-(SP)        ;STORE R4
1223 024512  012701  003062                MOV     #RESPARM,R1     ;GET START OF PARAM
1224 024516  012103                        MOV     (R1)+,R3        ;GET NUMBER OF PARAM
1225 024520                                PRINTB  #FMT1.1,#MRSLT,(R1)     ;PRINT NAME
     024520  011146                        MOV     (R1),-(SP)
     024522  012746  005423                MOV     #MRSLT,-(SP)
     024526  012746  011541                MOV     #FMT1.1,-(SP)
     024532  012746  000003                MOV     #3,-(SP)
     024536  010600                        MOV     SP,R0
     024540  104414                        TRAP    C$PNTB
     024542  062706  000010                ADD     #10,SP
1226 024546  021127  011057                CMP     (R1),#MNDRST    ;TEST IF MESSAGE IS NO DRV STATUS
1227 024552  001453                        BEQ     6$              ;YES - SKIP REST OF REPORT
1228 024554  012704  011760                MOV     #FMT11,R4       ;PRESET FOR FORMAT 11
1229 024560  022127  011052                CMP     (R1)+,#MCYLOC   ;CHECK IF REPORTING CYLINDER LOC
1230 024564  001002                        BNE     3$              ;NO - SKIP
1231 024566  012704  011766                MOV     #FMT12,R4       ;ELSE CHANGE TO FORMAT 12
1232 024572  005303                   3$:  DEC     R3              ;DEC PARAM COUNT
1233 024574  001442                        BEQ     6$              ;IF 0 - EXIT
```

```
024576                                    PRINTB  R4,#RESE3,(R1)+  ;REPORT IS VALUE
024576  012146                            MOV     (R1)+,-(SP)
024600  012746  011300                    MOV     #RESE3,-(SP)
024604  010446                            MOV     R4,-(SP)
024606  012746  000003                    MOV     #3,-(SP)
024612  010600                            MOV     SP,R0
024614  104414                            TRAP    C$PNTB
024616  062706  000010                    ADD     #10,SP
024622                                    PRINTB  R4,#RESE4,(R1)+  ;REPORT SB VALUE
024622  012146                            MOV     (R1)+,-(SP)
024624  012746  011304                    MOV     #RESE4,-(SP)
024630  010446                            MOV     R4,-(SP)
024632  012746  000003                    MOV     #3,-(SP)
024636  010600                            MOV     SP,R0
024640  104414                            TRAP    C$PNTB
024642  062706  000010                    ADD     #10,SP
024646  162703  000002                    SUB     #2,R3           ;DEC PARAM COUNT
024652  001413                            BEQ     6$              ;IF 0 - EXIT
024654                                    PRINTB  #FMT1,#RESE5,(R1)+  ;REPORT CONDITION
024654  012146                            MOV     (R1)+,-(SP)
024656  012746  011311                    MOV     #RESE5,-(SP)
024662  012746  011534                    MOV     #FMT1,-(SP)
024666  012746  000003                    MOV     #3,-(SP)
024672  010600                            MOV     SP,R0
024674  104414                            TRAP    C$PNTB
024676  062706  000010                    ADD     #10,SP
024702  012604                    6$:     MOV     (SP)+,R4        ;RESTORE REGS
024704  012603                            MOV     (SP)+,R3
024706  012601                            MOV     (SP)+,R1
024710  000207                            RTS     PC              ;RETURN



                                  ;       REPORT PHYSICAL ADDRESS OF DEVICE UNDER TEST
                                  ;       AND ALL REGISTER CONTENTS.
024712                            RPTREM: PRINTB  #FMT5,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
024712  005046                            CLR     -(SP)
024714  156716  156113                    BISB    RLDRV+1,(SP)
024720  012746  006053                    MOV     #DRVNAM,-(SP)
024724  016746  156076                    MOV     RLBAS,-(SP)
024730  012746  006042                    MOV     #BASADD,-(SP)
024734  012746  011567                    MOV     #FMT5,-(SP)
024740  012746  000005                    MOV     #5,-(SP)
024744  010600                            MOV     SP,R0
024746  104414                            TRAP    C$PNTB
024750  062706  000014                    ADD     #14,SP
                                  ;       REPORT RL11 REGISTERS
024754                                    PRINTB  #FMT6,#CSNAM,#DANAM,#BANAM,#MPNAM,#CYLWD,#HDWD
024754  012746  010214                    MOV     #HDWD,-(SP)
024760  012746  010225                    MOV     #CYLWD,-(SP)
024764  012746  006137                    MOV     #MPNAM,-(SP)
024770  012746  006125                    MOV     #BANAM,-(SP)
024774  012746  006132                    MOV     #DANAM,-(SP)
025000  012746  006120                    MOV     #CSNAM,-(SP)
025004  012746  011607                    MOV     #FMT6,-(SP)
025010  012746  000007                    MOV     #7,-(SP)
025014  010600                            MOV     SP,R0
```

```
025016  104414                          TRAP    C$PNTB
025020  062706  000020                  ADD     #20,SP
025024                                  PRINTB  #FMT8,#LAB1,L.CS,L.DA,L.BA,L.MP
025024  016746  156012                  MOV     L.MP,-(SP)
025030  016746  156002                  MOV     L.BA,-(SP)
025034  016746  156000                  MOV     L.DA,-(SP)
025040  016746  155770                  MOV     L.CS,-(SP)
025044  012746  006144                  MOV     #LAB1,-(SP)
025050  012746  011721                  MOV     #FMT8,-(SP)
025054  012746  000006                  MOV     #6,-(SP)
025060  010600                          MOV     SP,R0
025062  104414                          TRAP    C$PNTB
025064  062706  000016                  ADD     #16,SP
025070                                  PRINTB  #FMT7,#LAB2,T.CS,T.DA,T.BA,T.MP,CURCYL,DESHD
025070  016746  156016                  MOV     DESHD,-(SP)
025074  016746  156004                  MOV     CURCYL,-(SP)
025100  016746  155746                  MOV     T.MP,-(SP)
025104  016746  155736                  MOV     T.BA,-(SP)
025110  016746  155734                  MOV     T.DA,-(SP)
025114  016746  155724                  MOV     T.CS,-(SP)
025120  012746  006157                  MOV     #LAB2,-(SP)
025124  012746  011651                  MOV     #FMT7,-(SP)
025130  012746  000010                  MOV     #10,-(SP)
025134  010600                          MOV     SP,R0
025136  104414                          TRAP    C$PNTB
025140  062706  000022                  ADD     #22,SP
025144  000207                          RTS     PC




                                ;       CLEAR PARAMETER BLOCK FOR REPORTING
025146  010546                  CLRPARM: MOV    R5,-(SP)                ;STORE R5
025150  012701  003062                  MOV     #RESPARM,R1             ;GET ADDRESS OF BLOCK
025154  012705  000005                  MOV     #5,R5                   ;SET COUNT
025160  005021                  2$:     CLR     (R1)+                   ;CLEAR WORD
025162  005305                          DEC     R5                      ;DEC COUNT
025164  001375                          BNE     2$                      ;LOOP UNTIL 0
025166  012701  003062                  MOV     #RESPARM,R1             ;RESET POINTER
025172  012605                          MOV     (SP)+,R5                ;RESTORE R5
025174  000207                          RTS     PC

025176                          ENDMOD




                                .TITLE  CZRLIDO RL01/02 DRIVE TEST 1




                                ;DISK STATE FUNCTIONS
                                ;
                                ;BITS 0-2 OF THE MULTIPURPOSE REGISTER DURING GET STATUS COMMAND DEFINE THE
                                ;STATE OF THE DRIVE
                                ;
                                ;       STATE   0               LOAD STATE
                                ;       STATE   1               SPIN UP
```

```
   1284                                ;        STATE    2              BRUSH CYCLE
   1285                                ;        STATE    3              LOAD HEADS
   1286                                ;        STATE    4              SEEK
   1287                                ;        STATE    5              LOCK ON
   1288                                ;        STATE    6              UNLOAD HEADS
   1289                                ;        STATE    7              SPIN DOWN
   1290
   1291
   1292
```

```
025176                          BGNMOD  HRDWTST



                                .SBTTL  *TEST 1         BASIC INTERFACE (PART 1)

025176                          BGNTST                  ;TEST01
025176                                                                          T1::
                                                        ;TEST THAT UNLOAD, COVER OPEN AND WRITE PROTECT START
                                                        ;IN THE PROPER STATE.
025176  005767  156156                  TST     PASNUM          ;CHECK IF FIRST PASS
025202  001124                          BNE     65$             ;EXIT IF NO
025204  005767  167116                  TST     MISWIW          ;CHECK IF MANUAL INTERVENTION
025210  100121                          BPL     65$             ;NO - EXIT TEST
025212  012767  006373  155572  2$:     MOV     #MISTST,ERHEAD  ;LOAD ERR HEADER
                                                                ;PROMPT CHK DRV IS UNLDED, COVR OPN, AND
                                                                ;WRTE LCKED
025220                                  PRINTF  #FMTOP1,#OPR1,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
025220  005046                          CLR     -(SP)
025222  156716  155605                  BISB    RLDRV+1,(SP)
025226  012746  006053                  MOV     #DRVNAM,-(SP)
025232  016746  155570                  MOV     RLBAS,-(SP)
025236  012746  006042                  MOV     #BASADD,-(SP)
025242  012746  010135                  MOV     #OPR1A,-(SP)
025246  012746  007540                  MOV     #OPR1,-(SP)
025252  012746  011442                  MOV     #FMTOP1,-(SP)
025256  012746  000007                  MOV     #7,-(SP)
025262  010600                          MOV     SP,R0
025264  104417                          TRAP    C$PNTF
025266  062706  000020                  ADD     #20,SP

025272  005067  157066                  CLR     OBUFF           ;CLEAR FOR RESPONSE
025276                                  GMANIL  OPR002,OBUFF,1,NO
025276  104443                          TRAP    C$GMAN
025300  000404                          BR      10000$
025302  004364                          .WORD   OBUFF
025304  000120                          .WORD   T$CODE
025306  007470                          .WORD   OPR002
025310  000001                          .WORD   1
025312                          10000$:
025312  005767  157046                  TST     OBUFF           ;TEST RESPONSE YES
025316  001735                          BEQ     2$              ;YES - SKIP
025320  004767  171504          1$:     JSR     PC,TSTINT       ;INITIALIZE TEST
025324  004767  171516                  JSR     PC,GSTATR       ;GO GET STATUS WITH RESET
025330  025454                          65$
025332  032767  000040  155512          BIT     #COSTAT,T.MP    ;CHECK IF COVER OPEN SET
025340  001006                          BNE     7$              ;YES - SKIP
025342  012703  010562                  MOV     #MCOSTA,R3      ;SET NAME POINTER
025346                                  ERRHRD  101.,,ERR3
025346  104456                          TRAP    C$ERHRD
025350  000145                          .WORD   101
025352  000000                          .WORD   0
025354  012600                          .WORD   ERR3
025356  032767  000010  155466  7$:     BIT     #BHSTAT,T.MP    ;TEST IF BRUSHES HOME
025364  001006                          BNE     9$              ;YES - SKIP
025366  012703  010575                  MOV     #MBHSTA,R3      ;SET POINTER FOR BRUSH HOME ERROR
025372                                  ERRHRD  102.,,ERR3
```

```
   025372  104456                                  TRAP    C$ERHRD
   025374  000146                                  .WORD   102
   025376  000000                                  .WORD   0
   025400  012600                                  .WORD   ERR3
34 025402  032767  020000  155442  9$:             BIT     #WLSTAT,T.MP        ;TEST IF WRITE LOCK SET
35 025410  001006                                  BNE     11$                 ;YES - SKIP
36 025412  012703  010610                          MOV     #MWLSTA,R3          ;SET NAME POINTER
37 025416                                          ERRHRD  103.,,ERR3
   025416  104456                                  TRAP    C$ERHRD
   025420  000147                                  .WORD   103
   025422  000000                                  .WORD   0
   025424  012600                                  .WORD   ERR3
38 025426  005767  155426          11$:            TST     T.STAT              ;TEST IF STATE ZERO
39 025432  001405                                  BEQ     15$                 ;YES - SKIP
40 025434  005003                                  CLR     R3                  ;SET STATE EXPECTED
41 025436                                          ERRHRD  104.,,ERR7
   025436  104456                                  TRAP    C$ERHRD
   025440  000150                                  .WORD   104
   025442  000000                                  .WORD   0
   025444  013666                                  .WORD   ERR7
42 025446  004767  171374          15$:            JSR     PC,GSTATR           ;DO DRIVE RESET
43 025452  025454                                  65$
44 025454                          65$:
45 025454                          ENDTST
   025454                          L10024:
   025454  104401                                  TRAP    C$ETST
46
47
48
49                                 .SBTTL  *TEST 2              BASIC INTERFACE (PART 2)
50
51 025456                          BGNTST                       ;TEST 2
   025456                                                                                     T2::
52                                                              ;VERIFY THAT COVER OPEN AND WRITE PROTECT WORK.
53 025456  005767  155676                          TST     PASNUM              ;TEST IF PASS 0
54 025462  001077                                  BNE     65$                 ;NO - SKIP
55 025464  005767  166636                          TST     MISWIW              ;TEST IF MANUAL INTERVENTION
56 025470  100074                                  BPL     65$                 ;NO - SKIP
57 025472  012767  006373  155312                  MOV     #MISTST,ERHEAD      ;SET ERROR HEADER
58
59 025500                                                                      ;PROMPT CLOSE COVER AND RESET WRITE LOCK.
60 025500                          2$:             PRINTF  #FMTOP1,#OPR2,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
   025500  005046                                  CLR     -(SP)
   025502  156716  155325                          BISB    RLDRV+1,(SP)
   025506  012746  006053                          MOV     #DRVNAM,-(SP)
   025512  016746  155310                          MOV     RLBAS,-(SP)
   025516  012746  006042                          MOV     #BASADD,-(SP)
   025522  012746  010135                          MOV     #OPR1A,-(SP)
   025526  012746  007616                          MOV     #OPR2,-(SP)
   025532  012746  011442                          MOV     #FMTOP1,-(SP)
   025536  012746  000007                          MOV     #7,-(SP)
   025542  010600                                  MOV     SP,R0
   025544  104417                                  TRAP    C$PNTF
   025546  062706  000020                          ADD     #20,SP
61 025552  005067  156606                          CLR     OBUFF               ;CLEAR FOR RESPONSE
62 025556                                          GMANIL  OPR002,OBUFF,1,NO
   025556  104443                                  TRAP    C$GMAN
```

```
        025560  000404                            BR      10000$
        025562  004364                            .WORD   OBUFF
        025564  000120                            .WORD   T$CODE
        025566  007470                            .WORD   OPR002
        025570  000001                            .WORD   1
        025572                            10000$:
     63 025572  005767  156566                    TST     OBUFF           ;TEST IF RESPONSE YES
     64 025576  001740                            BEQ     2$              ;NO - SKIP
     65
     66 025600  004767  171224            1$:     JSR     PC,TSTINT       ;INITIALIZE TEST
     67 025604  004767  171236                    JSR     PC,GSTATR       ;GET STATUS WITH RESET
     68 025610  025662                            65$
     69 025612  032767  000040  155232            BIT     #COSTAT,T.MP    ;TEST IF COVER OPEN RESET
     70 025620  001406                            BEQ     9$              ;YES - SKIP
     71 025622  012703  010562                    MOV     #MCOSTA,R3      ;SET NAME MESSAGE POINTER
     72 025626                                    ERRHRD  201.,,ERR2
        025626  104456                            TRAP    C$ERHRD
        025630  000311                            .WORD   201
        025632  000000                            .WORD   0
        025634  012532                            .WORD   ERR2
     73
     74 025636  032767  020000  155206    9$:     BIT     #WLSTAT,T.MP    ;TEST IF WRITE LOCK RESET
     75 025644  001406                            BEQ     65$             ;YES - SKIP
     76 025646  012703  010610                    MOV     #MWLSTA,R3      ;SET NAME MESSAGE POINTER
     77 025652                                    ERRHRD  202.,,ERR2
        025652  104456                            TRAP    C$ERHRD
        025654  000312                            .WORD   202
        025656  000000                            .WORD   0
        025660  012532                            .WORD   ERR2
     78 025662                            65$:
     79 025662                            ENDTST
        025662                            L10025:
        025662  104401                            TRAP    C$ETST
     80
     81
     82
     83                                   .SBTTL  *TEST 3                 HEAD LOADING
     84 025664                            BGNTST                          ;TEST03
        025664                                                                              T3::
     85                                                                   ;SPIN UP THE DRIVE. VERIFY THAT THE DRIVE GOES FROM
     86                                                                   ;STATE 0 TO STATE 5 PROPERLY.
     87 025664  005767  155470                    TST     PASNUM          ;TEST IF PASS 0
     88 025670  001003                            BNE     1$              ;NO - SKIP
     89 025672  005767  166430                    TST     MISWIW          ;TEST IF MANUAL INTERVENTION
     90 025676  100402                            BMI     2$              ;YES - SKIP
     91 025700                            1$:     EXIT    TST
        025700  104432                            TRAP    C$EXIT
        025702  002440                            .WORD   L10026-.
     92 025704  004767  171120            2$:     JSR     PC,TSTINT       ;INITIALIZE TEST
     93 025710  004767  171132                    JSR     PC,GSTATR       ;GET STATUS
     94 025714  030342                            T365$
     95 025716  005767  155136                    TST     T.STAT          ;TEST IF STATE 0
     96 025722  001426                            BEQ     4$              ;YES - SKIP
     97 025724                            3$:                             ;PRINT UNEXPECTED ERROR AND EXIT TEST
     98 025724                                    PRINTF  #FMTOP1,#UNXERR,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
        025724  005046                            CLR     -(SP)
        025726  156716  155101                    BISB    RLDRV+1,(SP)
```

```
025732  012746  006053                  MOV     #DRVNAM,-(SP)
025736  016746  155064                  MOV     RLBAS,-(SP)
025742  012746  006042                  MOV     #BASADD,-(SP)
025746  012746  010135                  MOV     #OPR1A,-(SP)
025752  012746  006350                  MOV     #UNXERR,-(SP)
025756  012746  011442                  MOV     #FMTOP1,-(SP)
025762  012746  000007                  MOV     #7,-(SP)
025766  010600                          MOV     SP,R0
025770  104417                          TRAP    C$PNTF
025772  062706  000020                  ADD     #20,SP
025776  104401                          TRAP    C$ETST

026000                          4$:                             ;PROMPT OPERATOR TO "PRESS LOAD"
026000                                  PRINTF  #FMTOP1,#OPR3,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
026000  005046                          CLR     -(SP)
026002  156716  155025                  BISB    RLDRV+1,(SP)
026006  012746  006053                  MOV     #DRVNAM,-(SP)
026012  016746  155010                  MOV     RLBAS,-(SP)
026016  012746  006042                  MOV     #BASADD,-(SP)
026022  012746  010135                  MOV     #OPR1A,-(SP)
026026  012746  007651                  MOV     #OPR3,-(SP)
026032  012746  011442                  MOV     #FMTOP1,-(SP)
026036  012746  000007                  MOV     #7,-(SP)
026042  010600                          MOV     SP,R0
026044  104417                          TRAP    C$PNTF
026046  062706  000020                  ADD     #20,SP

026052  012767  000004  154724          MOV     #CYLUP,OPFLAG   ;SET CYCLE UP FLAG
026060  012703  000001                  MOV     #1,R3           ;SET EXPECTED STATE VALUE
026064  012767  006416  154720          MOV     #NSTACHG,ERHEAD ;SET ERROR HEADER
026072  012701  000454                  MOV     #300.,R1        ;WAIT COUNT R1*TIMDLY= 30 SECONDS.
026076  004767  170760          6$:     JSR     PC,GSTATC       ;GET STATUS
026102  030342                          T365$
026104  005767  154750                  TST     T.STAT          ;TEST IF STATE IS STILL 0
026110  001072                          BNE     10$             ;NO - SKIP
026112  005301                          DEC     R1              ;DEC WAIT COUNT
026114  001453                          BEQ     7$              ;EXIT IF WAIT DONE
026116                                  TIMDLY  1000.
026242  000715                          BR      6$

026244  005067  156114          7$:     CLR     OBUFF           ;CLEAR FOR RESPONSE
026250                                  GMANIL  OPR003,OBUFF,1,NO
026250  104443                          TRAP    C$GMAN
026252  000404                          BR      10000$
026254  004364                          .WORD   OBUFF
026256  000120                          .WORD   T$CODE
026260  007515                          .WORD   OPR003
026262  000001                          .WORD   1
026264                          10000$:
026264  005767  156074                  TST     OBUFF           ;TEST IF RESPONSE YES
026270  001005                          BNE     11$             ;YES - REPORT
026272  000167  177426                  JMP     3$
026276  020367  154556          10$:    CMP     R3,T.STAT       ;CHECK IF NOW STATE 1
026302  001406                          BEQ     13$             ;YES - SKIP
026304                          11$:    ERRHRD  301.,,ERR7
026304  104456                          TRAP    C$ERHRD
026306  000455                          .WORD   301
```

```
026310  000000                          .WORD   0
026312  013666                          .WORD   ERR7
026314                                  EXIT    TST
026314  104432                          TRAP    C$EXIT
026316  002024                          .WORD   L10026-.
026320  012701  000454          13$:    MOV     #300.,R1          ;INITIALIZE WAIT COUNT FOR 30 SECONDS
026324  012703  000002                  MOV     #2,R3             ;SET EXPECTED STATE VALUE
026330  004767  170526          14$:    JSR     PC,GSTATC         ;GET STATUS
026334  030342                          T365$
026336  020367  154516                  CMP     R3,T.STAT         ;CHECK IF STATE 2
026342  001503                          BEQ     20$               ;YES - GO TO STATE 2
026344  002002                          BGE     17$               ;CHECK IF NO CHANGE CONTINUE WAIT
026346  000167  001000                  JMP     32$               ;GO TO STATE 3.
026352  005301                  17$:    DEC     R1                ;DEC WAIT COUNT
026354  001453                          BEQ     18$               ;SKIP IF 0
026356                                  TIMDLY  1000.
026502  000712                          BR      14$               ;CHECK FOR STATE CHANGE
026504                          18$:    ERRHRD  303.,,ERR7
026504  104456                          TRAP    C$ERHRD
026506  000457                          .WORD   303
026510  000000                          .WORD   0
026512  013666                          .WORD   ERR7
026514  032767  004000  154330          BIT     #SPDSTAT,T.MP     ;TEST IF SPINDLE TIMEOUT
026522  001011                          BNE     19$               ;YES - SKIP
026524  012767  006430  154260          MOV     #SPDERR,ERHEAD    ;SET ERROR HEADER
026532  012703  010662                  MOV     #MSPERR,R3        ;SET NAME MESSAGE POINTER
026536                                  ERRHRD  304.,,ERR3
026536  104456                          TRAP    C$ERHRD
026540  000460                          .WORD   304
026542  000000                          .WORD   0
026544  012600                          .WORD   ERR3
026546                          19$:    EXIT    TST
026546  104432                          TRAP    C$EXIT
026550  001572                          .WORD   L10026-.

026552  012701  000005          20$:    MOV     #5,R1             ;WAIT .5 SECONDS
026556                          21$:    TIMDLY  1000.
026702  005301                          DEC     R1
026704  001324                          BNE     21$

026706  004767  170150                  JSR     PC,GSTATC         ;CHECK TO SEE IF STATE 3, IF YES GO TO STATE 3
026712  030342                          T365$
026714  022767  000003  154136          CMP     #3,T.STAT
026722  003002                          BGT     22$
026724  000167  000422                  JMP     32$

026730  012767  006373  154054  22$:    MOV     #MISTST,ERHEAD    ;SET ERROR HEADER
026736  012704  011323                  MOV     #STATE2,R4        ;SET CONDITION MESSAGE POINTER
026742  012703  010575                  MOV     #MBHSTA,R3        ;SET NAME MESSAGE POINTER
026746  032767  000010  154076          BIT     #BHSTAT,T.MP      ;TEST IF BRUSH HOME STILL SET
026754  001006                          BNE     23$               ;YES - SKIP
026756                                  ERRHRD  305.,,ERR5
026756  104456                          TRAP    C$ERHRD
026760  000461                          .WORD   305
026762  000000                          .WORD   0
026764  012716                          .WORD   ERR5
026766                                  EXIT    TST
```

```
    026766  104432                           TRAP    C$EXIT
    026770  001352                           .WORD   L10026-.
164 026772  012701  000062          23$:     MOV     #50.,R1          ;SET WAIT COUNT FOR 5 SECONDS
165 026776  004767  170060          24$:     JSR     PC,GSTATC        ;GET STATUS
166 027002  030342                           T365$
167 027004  032767  000010  154040           BIT     #BHSTAT,T.MP     ;TEST IF BRUSH HOME RESET
168 027012  001463                           BEQ     27$              ;YES - SKIP
169 027014  005301                           DEC     R1               ;DEC WAIT COUNT
170 027016  001453                           BEQ     26$              ;SKIP IF ZERO
171 027020                                   TIMDLY  1000.
172 027144  000714                           BR      24$              ;LOOP
173 027146                          26$:     ERRHRD  306.,,ERR4
    027146  104456                           TRAP    C$ERHRD
    027150  000462                           .WORD   306
    027152  000000                           .WORD   0
    027154  012646                           .WORD   ERR4
174 027156                                   EXIT    TST
    027156  104432                           TRAP    C$EXIT
    027160  001162                           .WORD   L10026-.
175 027162  012701  000454          27$:     MOV     #300.,R1         ;INITIALIZE WAIT COUNT FOR 30 SECONDS
176 027166  004767  167670          28$:     JSR     PC,GSTATC        ;GET STATUS
177 027172  030342                           T365$
178 027174  032767  000010  153650           BIT     #BHSTAT,T.MP     ;TEST IF BRUSH HOME SET AGAIN
179 027202  001063                           BNE     32$              ;YES - SKIP
180 027204  005301                           DEC     R1               ;ELSE DEC WAIT COUNT
181 027206  001453                           BEQ     30$              ;SKIP IF 0
182 027210                                   TIMDLY  1000.
183 027334  000714                           BR      28$
184 027336                          30$:     ERRHRD  307.,,ERR5
    027336  104456                           TRAP    C$ERHRD
    027340  000463                           .WORD   307
    027342  000000                           .WORD   0
    027344  012716                           .WORD   ERR5
185 027346                                   EXIT    TST
    027346  104432                           TRAP    C$EXIT
    027350  000772                           .WORD   L10026-.
186 027352  012767  006416  153432  32$:     MOV     #NSTACHG,ERHEAD  ;SET ERROR HEADER
187 027360  012703  000003                   MOV     #3,R3            ;SET EXPECTED STATE VALUE
188 027364  004767  167472                   JSR     PC,GSTATC        ;GET STATUS
189 027370  030342                           T365$
190 027372  020367  153462                   CMP     R3,T.STAT        ;CHECK IF STATE 3
191 027376  001406                           BEQ     36$              ;YES - SKIP
192 027400                                   ERRHRD  308.,,ERR7
    027400  104456                           TRAP    C$ERHRD
    027402  000464                           .WORD   308
    027404  000000                           .WORD   0
    027406  013666                           .WORD   ERR7
193 027410                                   EXIT    TST
    027410  104432                           TRAP    C$EXIT
    027412  000730                           .WORD   L10026-.
194 027414  012767  006373  153370  36$:     MOV     #MISTST,ERHEAD   ;SET ERROR HEADER
195 027422  012704  011333                   MOV     #STATE3,R4       ;SET CONDITION MESSAGE POINTER
196 027426  012703  010621                   MOV     #MHOSTA,R3       ;SET NAME MESSAGE POINTER
197 027432  004767  167424                   JSR     PC,GSTATC        ;GET STATUS
198 027436  030342                           T365$
199 027440  032767  000020  153404           BIT     #HOSTAT,T.MP     ;TEST IF HEADS OUT SET
200 027446  001006                           BNE     38$              ;YES - SKIP
```

```
201 027450                                          ERRHRD  309.,,ERR5
    027450 104456                                   TRAP    C$ERHRD
    027452 000465                                   .WORD   309
    027454 000000                                   .WORD   0
    027456 012716                                   .WORD   ERR5
202 027460                                          EXIT    TST
    027460 104432                                   TRAP    C$EXIT
    027462 000660                                   .WORD   L10026-.
203 027464 012701 005670                38$:        MOV     #3000.,R1               ;SET WAIT COUNT FOR 300 MS
204 027470 012767 006416 153314                     MOV     #NSTACHG,ERHEAD ;SET ERROR HEADER
205 027476 012703 000004                            MOV     #4,R3           ;SET EXPECTED STATE VALUE
206 027502 004767 167354                43$:        JSR     PC,GSTATC       ;GET STATUS
207 027506 030342                                   T365$
208 027510 020367 153344                            CMP     R3,T.STAT       ;CHECK IF STATE 4
209 027514 001463                                   BEQ     49$             ;YES - SKIP
210 027516 005301                                   DEC     R1              ;DEC WAIT COUNT
211 027520 001453                                   BEQ     47$             ;SKIP IF 0
212 027522                                          TIMDLY  1
213 027646 000715                                   BR      43$
214 027650                                  47$:    ERRHRD  312.,,ERR7
    027650 104456                                   TRAP    C$ERHRD
    027652 000470                                   .WORD   312
    027654 000000                                   .WORD   0
    027656 013666                                   .WORD   ERR7
215 027660                                          EXIT    TST
    027660 104432                                   TRAP    C$EXIT
    027662 000460                                   .WORD   L10026-.
216 027664 012701 000454                49$:        MOV     #300.,R1        ;SET WAIT COUNT FOR 30 MS
217 027670 012703 000005                            MOV     #5,R3           ;SET EXPECTED STATE VALUE
218 027674 004767 167162                50$:        JSR     PC,GSTATC       ;GET STATUS
219 027700 030342                                   T365$
220 027702 020367 153152                            CMP     R3,T.STAT       ;CHECK IF STATE 5
221 027706 001463                                   BEQ     53$             ;YES - SKIP
222 027710 005301                                   DEC     R1              ;DEC WAIT COUNT
223 027712 001453                                   BEQ     52$             ;ELSE SKIP
224 027714                                          TIMDLY  1
225 030040 000715                                   BR      50$
226 030042                                  52$:    ERRHRD  313.,,ERR7
    030042 104456                                   TRAP    C$ERHRD
    030044 000471                                   .WORD   313
    030046 000000                                   .WORD   0
    030050 013666                                   .WORD   ERR7
227 030052                                          EXIT    TST
    030052 104432                                   TRAP    C$EXIT
    030054 000266                                   .WORD   L10026-.
228 030056 032767 001000 152766         53$:        BIT     #VCSTAT,T.MP    ;VOLUME CHECK SHOULD BE SET FOR
229 030064 001010                                   BNE     54$             ;STATE 5, IF NOT GIVE ERROR.
230 030066 012703 010551                            MOV     #MVOLCK,R3      ;SET NAME MESSAGE POINTER
231 030072                                          ERRHRD  310.,,ERR5
    030072 104456                                   TRAP    C$ERHRD
    030074 000466                                   .WORD   310
    030076 000000                                   .WORD   0
    030100 012716                                   .WORD   ERR5
232 030102                                          EXIT    TST
    030102 104432                                   TRAP    C$EXIT
    030104 000236                                   .WORD   L10026-.
233 030106 032767 040000 152730         54$:        BIT     #DRVERR,T.CS    ;TEST IF DRIVE ERROR SET
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030114  001010                                   BNE     57$              ;YES - SKIP
030116  012703  010526                           MOV     #MDRERR,R3       ;SET NAME MESSAGE POINTER
030122                                           ERRHRD  315.,,ERR5
030122  104456                                   TRAP    C$ERHRD
030124  000473                                   .WORD   315
030126  000000                                   .WORD   0
030130  012716                                   .WORD   ERR5
030132                                           EXIT    TST
030132  104432                                   TRAP    C$EXIT
030134  000206                                   .WORD   L10026-.
030136  012701  000120                   57$:    MOV     #80.,R1          ;SET WAIT FOR 8 MS
030142  004767  166714                   56$:    JSR     PC,GSTATC        ;GET STATUS
030146  030342                                   T365$
030150  032767  000001  152666                   BIT     #DRDYMSK,T.CS    ;CHECK IF DRIVE READY
030156  001071                                   BNE     172$             ;YES - SKIP
030160  005301                                   DEC     R1               ;DEC COUNT
030162  001453                                   BEQ     58$              ;SKIP IF 0
030164                                           TIMDLY  1
030310  000714                                   BR      56$
030312  012767  006373  152472   58$:    MOV     #MISTST,ERHEAD   ;SET ERROR HEADER
030320  012704  011343                           MOV     #STATE5,R4       ;SET CONDITION MESSAGE POINTER
030324  012703  010404                           MOV     #MDRDY,R3        ;SET NAME MESCAGE POINTER
030330                                           ERRHRD  316,,ERR5
030330  104456                                   TRAP    C$ERHRD
030332  000474                                   .WORD   316
030334  000000                                   .WORD   0
030336  012716                                   .WORD   ERR5
030340  000400                                   BR      172$             ;EXIT TEST
030342                                   172$:
030342                                   T365$:
030342                                   ENDTST
030342                                   L10026:
030342  104401                                   TRAP    C$ETST




                                         .SBTTL  *TEST 4          HEAD UNLOADING
030344                                   BGNTST                   ;TEST04
030344                                                                                T4::
                                                                  ;SPIN DOWN AND UNLOAD HEADS. VERIFY THAT THE DRIVE
                                                                  ;GOES FROM STATE 5 TO STATE 7 PROPERLY.
030344  005767  153010                           TST     PASNUM           ;TEST IF FIRST PASS
030350  001003                                   BNE     8$               ;NO - SKIP
030352  005767  163750                           TST     MISWIW           ;TEST IF MANUAL INTERVENTION
030356  100403                                   BMI     TST4             ;YES - SKIP
030360                                   8$:     EXIT    TST
030360  104432                                   TRAP    C$EXIT
030362  001146                                   .WORD   L10027-.

030364                                   BGNSUB
030364                                                                                T4.1:
030364  104402                                   TRAP    C$BSUB
030366  012767  006416  152416   TST4:   MOV     #NSTACHG,ERHEAD  ;SET ERROR HEADER
030374  004767  166430                           JSR     PC,TSTINT        ;INITIALIZE TEST
030400  004767  166442                           JSR     PC,GSTATR        ;GET STATUS
030404  031420                                   T465$
030406  032767  000001  152430                   BIT     #DRDYMSK,T.CS    ;CHECK IF DRIVE READY
```

```
  274 030414   001040                              BNE     3$                     ;YES - SKIP
  275                                                                             ;PROMPT PRESS LD AND WAIT FOR RDY
  276 030416                             1$:       PRINTF  #FMTOP1,#OPR6,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
      030416   005046                              CLR     -(SP)
      030420   156716   152407                     BISB    RLDRV+1,(SP)
      030424   012746   006053                     MOV     #DRVNAM,-(SP)
      030430   016746   152372                     MOV     RLBAS,-(SP)
      030434   012746   006042                     MOV     #BASADD,-(SP)
      030440   012746   010135                     MOV     #OPR1A,-(SP)
      030444   012746   007665                     MOV     #OPR6,-(SP)
      030450   012746   011442                     MOV     #FMTOP1,-(SP)
      030454   012746   000007                     MOV     #7,-(SP)
      030460   010600                              MOV     SP,R0
      030462   104417                              TRAP    C$PNTF
      030464   062706   000020                     ADD     #20,SP
  277 030470   005067   153670                     CLR     OBUFF                  ;CLEAR FOR RESPONSE
  278 030474                                       GMANIL  OPR002,OBUFF,1,NO
      030474   104443                              TRAP    C$GMAN
      030476   000404                              BR      10000$
      030500   004364                              .WORD   OBUFF
      030502   000120                              .WORD   T$CODE
      030504   007470                              .WORD   OPR002
      030506   000001                              .WORD   1
      030510                             10000$:
  279 030510   005767   153650                     TST     OBUFF                  ;TST RESPONSE YES
  280 030514   001740                              BEQ     1$                     ;NO - SKIP
  281
  282 030516   052767   000010   152260  3$:       BIS     #ULOAD,OPFLAG          ;SET UNLOAD OPERATION
  283                                                                             ;PROMPT PRESS LOAD
  284 030524                             4$:       PRINTF  #FMTOP1,#OPR3,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
      030524   005046                              CLR     -(SP)
      030526   156716   152301                     BISB    RLDRV+1,(SP)
      030532   012746   006053                     MOV     #DRVNAM,-(SP)
      030536   016746   152264                     MOV     RLBAS,-(SP)
      030542   012746   006042                     MOV     #BASADD,-(SP)
      030546   012746   010135                     MOV     #OPR1A,-(SP)
      030552   012746   007651                     MOV     #OPR3,-(SP)
      030556   012746   011442                     MOV     #FMTOP1,-(SP)
      030562   012746   000007                     MOV     #7,-(SP)
      030566   010600                              MOV     SP,R0
      030570   104417                              TRAP    C$PNTF
      030572   062706   000020                     ADD     #20,SP
  285
  286 030576   012703   000006                     MOV     #6,R3                  ;SET EXPECTED STATE VALUE
  287 030602   012704   000144                     MOV     #100.,R4               ;SET SECOND LEVEL COUNT
  288 030606   012701   001274                     MOV     #700.,R1               ;SET WAIT COUNT FOR 30 SECONDS
  289 030612   004767   166244           5$:       JSR     PC,GSTATC              ;GET STATUS
  290 030616   031420                              T465$
  291 030620   020367   152234                     CMP     R3,T.STAT              ;WATCH FOR STATE CHANGE FROM 5 TO 6
  292 030624   001506                              BEQ     11$                    ;YES - SKIP
  293 030626   022767   000005   152224            CMP     #5,T.STAT              ;TEST IF STATE 5.
  294 030634   001074                              BNE     9$                     ;NO - REPORT WRONG STATE
  295 030636   005304                    8$:       DEC     R4                     ;DEC 2ND LEVEL COUNT
  296 030640   001004                              BNE     6$                     ;SKIP IF NOT 0
  297 030642   005301                              DEC     R1                     ;ELSE DEC 1ST LEVEL COUNT
  298 030644   001455                              BEQ     7$                     ;IF 0 - SKIP TO QUESTION
  299 030646   012704   000144                     MOV     #100.,R4               ;ELSE RESET 2ND LEVEL
```

```
030652                              6$:     TIMDLY  1                   ;WAIT 100 US
030776  000705                              BR      5$
031000  005067  153360              7$:     CLR     OBUFF               ;CLEAR FOR RESPONSE
031004                                      GMANIL  OPR003,OBUFF,1,NO
031004  104443                              TRAP    C$GMAN
031006  000404                              BR      10001$
031010  004364                              .WORD   OBUFF
031012  000120                              .WORD   T$CODE
031014  007515                              .WORD   OPR003
031016  000001                              .WORD   1
031020                              10001$:
031020  005767  153340                      TST     OBUFF               ;TEST IF RESPONSE YES
031024  001637                              BEQ     4$                  ;NO - SKIP
031026                              9$:     ERRHRD  401.,,ERR7          ;ELSE REPORT STATE CHANGE WRONG
031026  104456                              TRAP    C$ERHRD
031030  000621                              .WORD   401
031032  000000                              .WORD   0
031034  013666                              .WORD   ERR7
031036                                      EXIT    SUB
031036  104432                              TRAP    C$EXIT
031040  000366                              .WORD   L10030-.
031042  012703  000007              11$:    MOV     #7,R3               ;SET EXPECTED STATE VALUE
031046  012701  005670                      MOV     #3000.,R1           ;SET COUNT FOR 300MS
031052  004767  166004              12$:    JSR     PC,GSTATC           ;GET STATUS
031056  031420                              T465$
031060  020367  151774                      CMP     R3,T.STAT           ;CHECK IF STATE 7
031064  001463                              BEQ     18$                 ;YES - SKIP
031066  005301                              DEC     R1                  ;DEC WAIT COUNT
031070  001453                              BEQ     16$                 ;TIME OUT GIVE ERROR MESSAGE
031072                                      TIMDLY  1
031216  000715                              BR      12$
031220                              16$:    ERRHRD  402.,,ERR7          ;REPORT WRONG STATE CHANGE
031220  104456                              TRAP    C$ERHRD
031222  000622                              .WORD   402
031224  000000                              .WORD   0
031226  013666                              .WORD   ERR7
031230                                      EXIT    SUB
031230  104432                              TRAP    C$EXIT
031232  000174                              .WORD   L10030-.
031234  005003                      18$:    CLR     R3                  ;SET EXPECTED STATE VALUE
031236  012701  013560                      MOV     #6000.,R1           ;SET WAIT COUNT FOR 60 SECONDS
031242  004767  165614              20$:    JSR     PC,GSTATC           ;GET STATUS
031246  031420                              T465$
031250  005767  151604                      TST     T.STAT              ;CHECK IF STATE 0
031254  001461                              BEQ     24$                 ;YES - SKIP
031256  005301                              DEC     R1                  ;DEC WAIT COUNT
031260  001453                              BEQ     22$                 ;SKIP IF 0
031262                                      TIMDLY  100.
031406  000715                              BR      20$
031410                              22$:    ERRHRD  403.,,ERR7          ;REPORT WRONG STATE CHANGE
031410  104456                              TRAP    C$ERHRD
031412  000623                              .WORD   403
031414  000000                              .WORD   0
031416  013666                              .WORD   ERR7
031420                              24$:
031420  012767  000002  151370      T465$:  MOV     #2,ERRSWI           ;INIT ERROR SWITCH
```

```
 031426                                 ENDSUB
 031426                                 L10030:
 031426  104403                                 TRAP    C$ESUB
                                                                        ;PROMPT PRESS LD AND WAIT FOR RDY
 031430                                 26$:    PRINTF  #FMTOP1,#OPR6,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
 031430  005046                                 CLR     -(SP)
 031432  156716  151375                         BISB    RLDRV+1,(SP)
 031436  012746  006053                         MOV     #DRVNAM,-(SP)
 031442  016746  151360                         MOV     RLBAS,-(SP)
 031446  012746  006042                         MOV     #BASADD,-(SP)
 031452  012746  010135                         MOV     #OPR1A,-(SP)
 031456  012746  007665                         MOV     #OPR6,-(SP)
 031462  012746  011442                         MOV     #FMTOP1,-(SP)
 031466  012746  000007                         MOV     #7,-(SP)
 031472  010600                                 MOV     SP,R0
 031474  104417                                 TRAP    C$PNTF
 031476  062706  000020                         ADD     #20,SP

 031502  005067  152656                         CLR     OBUFF           ;CLEAR FOR RESPONSE
 031506                                         GMANIL  OPR002,OBUFF,1,NO
 031506  104443                                 TRAP    C$GMAN
 031510  000404                                 BR      10000$
 031512  004364                                 .WORD   OBUFF
 031514  000120                                 .WORD   T$CODE
 031516  007470                                 .WORD   OPR002
 031520  000001                                 .WORD   1
 031522                                 10000$:
 031522  005767  152636                         TST     OBUFF           ;TEST IF RESPONSE YES
 031526  001740                                 BEQ     26$             ;NO - SKIP
 031530                                 29$:

 031530                                 ENDTST
 031530                                 L10027:
 031530  104401                                 TRAP    C$ETST



                                        .SBTTL  *TEST 5         DRIVE SELECT
 031532                                 BGNTST                  ;TEST05
 031532                                                                                 T5::
 031532  012767  000002  151256                 MOV     #2,ERRSWI       ;SET FOR NO ERROR RETURN
 031540  005767  151614                         TST     PASNUM          ;TEST IF FIRST PASS
 031544  001173                                 BNE     EXT05           ;NO - SKIP
 031546  032767  000004  162552                 BIT     #DRSELT,MISWIW  ;TEST IF SELECT TESTS
 031554  001567                                 BEQ     EXT05           ;NO - SKIP
 031556                                 1$:     PRINTF  #FMTOP1,#OPR7,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
 031556  005046                                 CLR     -(SP)
 031560  156716  151247                         BISB    RLDRV+1,(SP)
 031564  012746  006053                         MOV     #DRVNAM,-(SP)
 031570  016746  151232                         MOV     RLBAS,-(SP)
 031574  012746  006042                         MOV     #BASADD,-(SP)
 031600  012746  010135                         MOV     #OPR1A,-(SP)
 031604  012746  007720                         MOV     #OPR7,-(SP)
 031610  012746  011442                         MOV     #FMTOP1,-(SP)
 031614  012746  000007                         MOV     #7,-(SP)
 031620  010600                                 MOV     SP,R0
 031622  104417                                 TRAP    C$PNTF
```

```
    031624  062706  000020                     ADD     #20,SP
                                                                          ;REQUEST ''REMOVE ADD PLGS EXCPT ''
    031630  005067  152530                     CLR     OBUFF              ;CLEAR FOR RESPONSE
    031634                                     GMANIL  OPR002,OBUFF,1,NO
    031634  104443                             TRAP    C$GMAN
    031636  000404                             BR      10000$
    031640  004364                             .WORD   OBUFF
    031642  000120                             .WORD   T$CODE
    031644  007470                             .WORD   OPR002
    031646  000001                             .WORD   1
    031650                            10000$:
    031650  005767  152510                     TST     OBUFF              ;TEST RESPONSE YES
    031654  001740                             BEQ     1$                 ;NO - SKIP
    031656  012767  006530  151126   3$:      MOV     #T05ERR,ERHEAD     ;SET ERROR HEADER MESSAGE
    031664  004767  165140                     JSR     PC,TSTINT          ;INITIALIZE TEST
    031670  004767  165166                     JSR     PC,GSTATC          ;DO SELECT AND GET STATUS
    031674  032056                             T504$
    031676  016767  151130  151212            MOV     RLDRV,TEMPO        ;STORE ORIGINAL DRIVE NUMBER
    031704  016701  151122                     MOV     RLDRV,R1           ;PUT IT IN R1
    031710  012704  000004                     MOV     #4,R4              ;SET COUNT FOR NUMBER OF PLUGS
    031714  062701  000400            LPT05:   ADD     #400,R1            ;BUMP TO NEXT DRIVE
    031720  022701  002000                     CMP     #2000,R1           ;CHECK IF TO LARGE
    031724  001001                             BNE     4$                 ;NO - SKIP
    031726  005001                             CLR     R1                 ;ELSE CLEAR TO DRIVE 0
    031730  010167  151076            4$:      MOV     R1,RLDRV           ;PUT IT BACK IN RLDRV
    031734                            5$:      PRINTF  #FMTOP3,#OPR8,<B,RLDRV+1>,#OPR1B,#UNDTST
    031734  012746  010151                     MOV     #UNDTST,-(SP)
    031740  012746  010141                     MOV     #OPR1B,-(SP)
    031744  005046                             CLR     -(SP)
    031746  156716  151061                     BISB    RLDRV+1,(SP)
    031752  012746  007747                     MOV     #OPR8,-(SP)
    031756  012746  011513                     MOV     #FMTOP3,-(SP)
    031762  012746  000005                     MOV     #5,-(SP)
    031766  010600                             MOV     SP,R0
    031770  104417                             TRAP    C$PNTF
    031772  062706  000014                     ADD     #14,SP
                                                                          ;INSERT PLUG REQUEST
    031776  005067  152362                     CLR     OBUFF              ;CLEAR FOR RESPONSE
    032002                                     GMANIL  OPR002,OBUFF,1,NO
    032002  104443                             TRAP    C$GMAN
    032004  000404                             BR      10001$
    032006  004364                             .WORD   OBUFF
    032010  000120                             .WORD   T$CODE
    032012  007470                             .WORD   OPR002
    032014  000001                             .WORD   1
    032016                            10001$:
    032016  005767  152342                     TST     OBUFF              ;TEST RESPONSE YES
    032022  001744                             BEQ     5$                 ;NO - SKIP
    032024                            BGNSUB
    032024                                                                                      T5.1:
    032024  104402                             TRAP    C$BSUB
    032026  004767  165030                     JSR     PC,GSTATC          ;GET STATUS - REPORT ANY ERROR
    032032  032034                             60$
    032034  012767  000002  150754   60$:     MOV     #2,ERRSWI          ;INIT ERROR SWITCH

    032042                            ENDSUB
    032042                            L10032:
```

```
    032042  104403                                  TRAP    C$ESUB
385 032044  005304                                  DEC     R4              ;DEC COUNT
386 032046  001322                                  BNE     LPT05           ;LOOP IF NOT ZERO
387 032050  016767  151042  150754                  MOV     TEMPO,RLDRV     ;ELSE RESTORE RLDRV
388 032056                                  T504$:
389 032056                                  4$:     PRINTF  #FMT4,#OPR8,#OPR9
    032056  012746  007766                          MOV     #OPR9,-(SP)
    032062  012746  007747                          MOV     #OPR8,-(SP)
    032066  012746  011556                          MOV     #FMT4,-(SP)
    032072  012746  000003                          MOV     #3,-(SP)
    032076  010600                                  MOV     SP,R0
    032100  104417                                  TRAP    C$PNTF
    032102  062706  000010                          ADD     #10,SP
390 032106  005067  152252                          CLR     OBUFF           ;CLEAR FOR RE?PONSE
391 032112                                          GMANIL  OPR002,OBUFF,1,NO
    032112  104443                                  TRAP    C$GMAN
    032114  000404                                  BR      10000$
    032116  004364                                  .WORD   OBUFF
    032120  000120                                  .WORD   T$CODE
    032122  007470                                  .WORD   OPR002
    032124  000001                                  .WORD   1
    032126                                  10000$:
392 032126  005767  152232                          TST     OBUFF           ;TEST IF RESPONSE YES
393 032132  001751                                  BEQ     4$              ;NO - SKIP
394 032134                                  EXT05:
395 032134                                  ENDTST
    032134                                  L10031:
    032134  104401                                  TRAP    C$ETST
396
397
398
399                                         .SBTTL  *TEST 6         DRIVE SELECT ERROR TEST
400 032136                                  BGNTST                  ;TEST06
    032136                                                                                  T6::
401 032136  005767  151216                          TST     PASNUM          ;CHECK IF FIRST PASS
402 032142  001004                                  BNE     1$              ;NO - SKIP
403 032144  032767  000004  162154                  BIT     #DRSELT,MISWIW  ;CHECK IF TEST DRIVE SELECT
404 032152  001002                                  BNE     6$              ;YES - SKIP
405 032154                                  1$:     EXIT    TST
    032154  104432                                  TRAP    C$EXIT
    032156  001230                                  .WORD   L10033-.
406 032160  012767  006464  150624          6$:     MOV     #GSTER1,ERHEAD  ;SET ERROR HEADER
407 032166  004767  164636                          JSR     PC,TSTINT       ;INITIALIZE TEST
408 032172  016703  151164                          MOV     PSETNM,R3       ;GET PARAM SET NUMBER
409 032176  026727  147610  000001                  CMP     L$UNIT,#1       ;TEST IF MORE THAN 1 UNIT
410 032204  101517                                  BLOS    5$              ;NO - SKIP
411 032206  005203                          2$:     INC     R3              ;BUMP PARAMETER SET NUMBER
412 032210  020367  147576                          CMP     R3,L$UNIT       ;CHECK IF PAST VALID PARAMETER TABLE
413 032214  101401                                  BLOS    3$              ;NO - SKIP
414 032216  005003                                  CLR     R3              ;ELSE CLEAR TO POINT TO ENTRY 0
415 032220                                  3$:     GPHARD  R3,R0
    032220  010300                                  MOV     R3,R0
    032222  104442                                  TRAP    C$GPHRD
416 032224                                          BNCOMPLETE      2$      ;SKIP IF NOT AVAILABLE
    032224  103370                                  BCC     2$
417 032226  010004                                  MOV     R0,R4           ;PUT POINTER INTO R4
418 032230  021467  150572                          CMP     (R4),RLBAS      ;CHECK IF SAME CONTROLLER
```

```
032234  001364                              BNE     2$                  ;NO - SKIP
032236  005067  150544                      CLR     DONE                ;CLEAR DONE FLAG
032242  012767  000104  150564              MOV     #GTSTAT,L.CS        ;LOAD GET STATUS
032250  056467  000010  150556              BIS     10(R4),L.CS         ;INSERT DRIVE
032256  012767  000013  150554              MOV     #GETSTAT!DRSET,L.DA     ;SET UP TO CLEAR DRIVE
032264  016762  150550  000004              MOV     L.DA,RLDA(R2)       ;LOAD DA REG
032272  016762  150536  000000              MOV     L.CS,RLCS(R2)       ;LOAD CS REG
032300                                      TIMDLY  30.                 ;WAIT 3 MS
032424  005767  150356                      TST     DONE                ;TEST  IF INTERRUPT
032430  001666                              BEQ     2$                  ;NO - SKIP
032432  032767  100000  150404              BIT     #ANYERR,T.CS        ;TEST IF ANY ERROR SET
032440  001415                              BEQ     7$                  ;NO - GO TEST
032442  000661                              BR      2$                  ;ELSE CHECK NEXT DRIVE
032444                              5$:     PRINTF  #FMT9,#OPR10        ;REPORT CAN'T FIND 2ND DRIVE
032444  012746  010003                      MOV     #OPR10,-(SP)
032450  012746  011753                      MOV     #FMT9,-(SP)
032454  012746  000002                      MOV     #2,-(SP)
032460  010600                              MOV     SP,R0
032462  104417                              TRAP    C$PNTF
032464  062706  000006                      ADD     #6,SP
032470  000167  000712                      JMP     LCLEXT
032474  016467  000010  150416      7$:     MOV     10(R4),TEMP1        ;STORE NEW ADDRESS
                                                                        ;ASK FOR PLUG CHANGE
032502  016700  150324              9$:     MOV     RLDRV,R0            ;GET DRIVE UNDER TEST
032506  016705  150406                      MOV     TEMP1,R5            ;GET NEW ADDRESS
032512  042700  002000                      BIC     #2000,R0            ;CLEAR FOR ADDRESS 0 TO 3
032516  042705  002000                      BIC     #2000,R5
032522  020527  001400              20$:    CMP     R5,#1400            ;TEST IF DRIVE NUMBER 3
032526  001001                              BNE     21$                 ;NO - SKIP
032530  005005                              CLR     R5                  ;ELSE SET TO DRIVE NUMBER 0
032532  062705  000400              21$:    ADD     #400,R5             ;BUMP TO NEXT ADDRESS
032536  020500                              CMP     R5,R0               ;THIS EQUAL TO NEW ADDRESS?
032540  001770                              BEQ     20$                 ;YES - SKIP
032542  052705  000200                      BIS     #CRDYMSK,R5         ;ELSE SET CONTROLLER READY BIT
032546  010562  000000                      MOV     R5,RLCS(R2)         ;AND LOAD CS REG
                                                                        ;PROMPT INSRT ADR PLG AN DRV
032552                                      PRINTF  #FMTOP2,#OPR8,<B,RLDRV+1>,#OPR1B,<B,TEMP1+1>
032552  005046                              CLR     -(SP)
032554  156716  150341                      BISB    TEMP1+1,(SP)
032560  012746  010141                      MOV     #OPR1B,-(SP)
032564  005046                              CLR     -(SP)
032566  156716  150241                      BISB    RLDRV+1,(SP)
032572  012746  007747                      MOV     #OPR8,-(SP)
032576  012746  011471                      MOV     #FMTOP2,-(SP)
032602  012746  000005                      MOV     #5,-(SP)
032606  010600                              MOV     SP,R0
032610  104417                              TRAP    C$PNTF
032612  062706  000014                      ADD     #14,SP
032616  005067  151542                      CLR     OBUFF               ;CLEAR FOR RESPONSE
032622                                      GMANIL  OPR002,OBUFF,1,NO
032622  104443                              TRAP    C$GMAN
032624  000404                              BR      10000$
032626  004364                              .WORD   OBUFF
032630  000120                              .WORD   T$CODE
032632  007470                              .WORD   OPR002
032634  000001                              .WORD   1
032636                              10000$:
    452 032636  005767  151522                  TST     OBUFF               ;TEST IF RESPONSE YES
    453 032642  001717                          BEQ     9$                  ;NO - SKIP
    454 032644  012704  000012                  MOV     #10.,R4             ;SET COUNT
    455 032650                          BGNSUB
        032650                                                                              T6.1:
        032650  104402                          TRAP    C$BSUB
    456 032652  016767  150154  150154  8$:     MOV     RLDRV,L.CS          ;SET UP TO SELECT MULTIPLE DRIVES
    457 032660  016762  150150  000000          MOV     L.CS,RLCSR(R2)      ;DO IT
    458 032666                                  TIMDLY  100.
    459 033012  052767  000104  150014          BIS     #GTSTAT,L.CS        ;SET GET STATUS
    460 033020  012767  000013  150012          MOV     #GETSTAT!DRSET,L.DA         ;SET RESET BIT 3 IN THE DA REG FOR THE
    461                                                                             ;/DRIVE TO CLEAR ITS ERROR REGISTER
    462                                                                             ;/BEFORE SENDING A STATUS WORD TO THE
    463                                                                             ;/MP REG DURING GET STATUS COMMAND
    464
    465 033026  016762  150006  000004          MOV     L.DA,RLDA(R2)
    466 033034  005067  147746                  CLR     DONE
    467 033040  016762  147770  000000          MOV     L.CS,RLCSR(R2)      ;DO GET STATUS
    468 033046                                  WAITUS  1                   ;WAIT FOR INTERRUPT
        033046  012727  000001                  MOV     #1,(PC)+
        033052  000000                          .WORD   0
        033054  016727  147036                  MOV     L$DLY,(PC)+
        033060  000000                          .WORD   0
        033062  005367  177772                  DEC     -6(PC)
        033066  001375                          BNE     .-4
        033070  005367  177756                  DEC     -22(PC)
        033074  001367                          BNE     .-20
    469 033076  005767  147704                  TST     DONE                ;CHECK IF INTERRUPTED
    470 033102  001012                          BNE     12$                 ;YES - SKIP
    471 033104  004767  163526                  JSR     PC,WAITIN           ;WAIT FOR TIMEOUT
    472 033110  012603                          MOV     (SP)+,R3            ;GET ERROR POINTER
    473 033112  001406                          BEQ     12$                 ;SKIP IF 0
    474 033114                                  ERRHRD  601.,GSTER1,ERR1
        033114  104456                          TRAP    C$ERHRD
        033116  001131                          .WORD   601
        033120  006464                          .WORD   GSTER1
        033122  012464                          .WORD   ERR1
    475 033124                                  EXIT    SUB
        033124  104432                          TRAP    C$EXIT
        033126  000204                          .WORD   L10034-.
    476 033130                          12$:    TIMDLY  20.                 ;WAIT FOR DSE TO SET
    477 033254  004767  164722                  JSR     PC,GDRSTA           ;GET STATUS
    478 033260  032767  000400  147564          BIT     #DSESTAT,T.MP       ;TEST IF DRIVE SELECT ERROR SET
    479 033266  001010                          BNE     16$                 ;YES - SKIP
    480 033270  012703  010632                  MOV     #MDSERR,R3          ;SET NAME MESSAGE POINTER
    481 033274                                  ERRHRD  602.,,ERR3
        033274  104456                          TRAP    C$ERHRD
        033276  001132                          .WORD   602
        033300  000000                          .WORD   0
        033302  012600                          .WORD   ERR3
    482 033304                                  EXIT    SUB
        033304  104432                          TRAP    C$EXIT
        033306  000024                          .WORD   L10034-.
    483 033310  010562  000000          16$:    MOV     R5,RLCS(R2)         ;LOAD IN DIFFERENT ADDRESS
    484 033314  005304                          DEC     R4                  ;DEC COUNT
    485 033316  001402                          BEQ     60$                 ;LOOP IF NOT ZERO
    486 033320  000167  177326                  JMP     8$
```

```
487 033324  012767  000002  147464  60$:    MOV     #2,ERRSWI          ;INIT ERROR SWITCH
488 033332                              ENDSUB
    033332                              L10034:
    033332  104403                              TRAP    C$ESUB
489 033334                              15$:    PRINTF  #FMT9,#OPR11       ;REQUEST PLUG CHANGE
    033334  012746  010051                      MOV     #OPR11,-(SP)
    033340  012746  011753                      MOV     #FMT9,-(SP)
    033344  012746  000002                      MOV     #2,-(SP)
    033350  010600                              MOV     SP,R0
    033352  104417                              TRAP    C$PNTF
    033354  062706  000006                      ADD     #6,SP
490 033360  005067  151000                      CLR     OBUFF              ;CLEAR FOR RESPONSE
491 033364                                      GMANIL  OPR002,OBUFF,1,NO
    033364  104443                              TRAP    C$GMAN
    033366  000404                              BR      10000$
    033370  004364                              .WORD   OBUFF
    033372  000120                              .WORD   T$CODE
    033374  007470                              .WORD   OPR002
    033376  000001                              .WORD   1
    033400                              10000$:
492 033400  005767  150760                      TST     OBUFF              ;TEST IF RESPONSE YES
493 033404  001753                              BEQ     15$                ;NO - SKIP
494 033406                              LCLEXT:
495 033406                              ENDTST
    033406                              L10033:
    033406  104401                              TRAP    C$ETST
496
497
498
499                                     .SBTTL  *TEST 7          INITIAL STATE
500 033410                              BGNTST                   ;TEST 07
    033410                                                                          T7::
501 033410  005767  147744                      TST     PASNUM             ;CHECK IF FIRST PASS
502 033414  001003                              BNE     1$                 ;NO - EXIT TEST
503 033416  005767  160704                      TST     MISWIW             ;CHECK IF MANUAL INTERVENTION
504 033422  100402                              BMI     3$                 ;PERFORM TEST IF MANUAL INTERVENTION
505 033424                              1$:     EXIT    TST
    033424  104432                              TRAP    C$EXIT
    033426  000652                              .WORD   L10035-.
506 033430  012767  006515  147354  3$:     MOV     #INITST,ERHEAD     ;SET ERROR HEADER
507 033436  004767  163366                      JSR     PC,TSTINT          ;INITIALIZE TEST
508 033442                                      TIMDLY  10.                ;WAIT 1 MS
509 033566  004767  163254                      JSR     PC,GSTATR          ;GET STATUS WITH RESET
510 033572  034300                              100$
511 033574  032767  000001  147242              BIT     #DRDYMSK,T.CS      ;CHECK IF DRIVE IS READY
512 033602  001432                              BEQ     20$                ;BRANCH IF DRIVE IS NOT READY
513
514 033604  052767  000010  147172              BIS     #ULOAD,OPFLAG      ;SET UNLOAD OPERATION
515                                                                        ;PROMPT OPERATOR TO "PRESS LOAD"
516 033612                                      PRINTF  #FMTOP1,#OPR3,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
    033612  005046                              CLR     -(SP)
    033614  156716  147213                      BISB    RLDRV+1,(SP)
    033620  012746  006053                      MOV     #DRVNAM,-(SP)
    033624  016746  147176                      MOV     RLBAS,-(SP)
    033630  012746  006042                      MOV     #BASADD,-(SP)
    033634  012746  010135                      MOV     #OPR1A,-(SP)
    033640  012746  007651                      MOV     #OPR3,-(SP)
    033644  012746  011442                      MOV     #FMTOP1,-(SP)
    033650  012746  000007                      MOV     #7,-(SP)
    033654  010600                              MOV     SP,R0
    033656  104417                              TRAP    C$PNTF
    033660  062706  000020                      ADD     #20,SP
    033664  012703  000000                      MOV     #0,R3           ;SET ''LOAD CARTRIDGE'' STATE VALUE 0

    033670  004767  163166          20$:        JSR     PC,GSTATC       ;GET STATUS
    033674  034300                              100$
    033676                                      BREAK                   ;MAKE A SUPERVISOR CALL
    033676  104422                              TRAP    C$BRK
    033700  022767  000000  147152              CMP     #0,T.STAT       ;TEST IF STATE 0
    033706  001370                              BNE     20$             ;WAIT FOR STATE 0

                                                                        ;PROMPT OPERATOR TO ''PRESS LOAD &
                                                                        ;/WAIT FOR READY''
    033710                          21$:        PRINTF  #FMTOP1,#OPR6,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
    033710  005046                              CLR     -(SP)
    033712  156716  147115                      BISB    RLDRV+1,(SP)
    033716  012746  006053                      MOV     #DRVNAM,-(SP)
    033722  016746  147100                      MOV     RLBAS,-(SP)
    033726  012746  006042                      MOV     #BASADD,-(SP)
    033732  012746  010135                      MOV     #OPR1A,-(SP)
    033736  012746  007665                      MOV     #OPR6,-(SP)
    033742  012746  011442                      MOV     #FMTOP1,-(SP)
    033746  012746  000007                      MOV     #7,-(SP)
    033752  010600                              MOV     SP,R0
    033754  104417                              TRAP    C$PNTF
    033756  062706  000020                      ADD     #20,SP
    033762  005067  150376                      CLR     OBUFF           ;CLEAR FOR RESPONSE
    033766                                      GMANIL  OPR002,OBUFF,1,NO         ;PROMPT OPERATOR FOR RESPONSE
    033766  104443                              TRAP    C$GMAN
    033770  000404                              BR      10000$
    033772  004364                              .WORD   OBUFF
    033774  000120                              .WORD   T$CODE
    033776  007470                              .WORD   OPR002
    034000  000001                              .WORD   1
    034002                          10000$:
    034002  005767  150356                      TST     OBUFF           ;TEST IF RESPONSE IS YES
    034006  001740                              BEQ     21$             ;BRANCH IF NOT READY

    034010  004767  163046          22$:        JSR     PC,GSTATC       ;GET STATUS
    034014  034300                              100$
    034016                                      BREAK                   ;MAKE A SUPERVISOR CALL
    034016  104422                              TRAP    C$BRK
    034020  022767  000005  147032              CMP     #5,T.STAT       ;CHECK IF STATE 5
    034026  001370                              BNE     22$             ;WAIT FOR STATE 5

    034030  016701  147016                      MOV     T.MP,R1         ;GET MP REG
    034034  032701  000020                      BIT     #HOSTAT,R1      ;CHECK HEADS OUT
    034040  001003                              BNE     7$              ;YES-SKIP
    034042  012703  010621                      MOV     #MHOSTA,R3      ;SET NAME MESSAGE PTR
    034046  000405                              BR      9$              ;GO REPORT
    034050  032701  000010          7$:         BIT     #BHSTAT,R1      ;CHECK BRUSH HOME SET
    034054  001010                              BNE     10$             ;YES-SKIP
    034056  012703  010575                      MOV     #MBHSTA,R3      ;SET NAME MESSAGE PTR
    034062                          9$:         ERRHRD  702.,,ERR3      ;REPORT ERROR
    034062  104456                              TRAP    C$ERHRD
    034064  001276                              .WORD   702
    034066  000000                              .WORD   0
    034070  012600                              .WORD   ERR3
548 034072                                      EXIT    TST                     ;EXIT
    034072  104432                              TRAP    C$EXIT
    034074  000204                              .WORD   L10035-.
549 034076  005767  160224              10$:    TST     MISWIW                  ;TEST IF MANUAL INTERVENTION RUN
550 034102  100035                              BPL     16$                     ;NO-SKIP
551 034104  005767  147250                      TST     PASNUM                  ;CHECK IF FIRST PASS
552 034110  001032                              BNE     16$                     ;NO-SKIP
553 034112  032701  000100                      BIT     #HSSTAT,R1              ;ELSE CHECK HD 0 SELECTED
554 034116  001412                              BEQ     13$                     ;YES-SKIP
555 034120  012703  010537                      MOV     #MHSTA,R3               ;SET NAME MESSAGE PTR
556 034124  012704  011412                      MOV     #CCYLUP,R4              ;SET CONDITION POINTER
557 034130                                      ERRHRD  703.,,ERR4              ;REPORT ERROR
    034130  104456                              TRAP    C$ERHRD
    034132  001277                              .WORD   703
    034134  000000                              .WORD   0
    034136  012646                              .WORD   ERR4
558 034140                                      EXIT    TST                     ;EXIT
    034140  104432                              TRAP    C$EXIT
    034142  000136                              .WORD   L10035-.
559 034144  032701  001000              13$:    BIT     #VCSTAT,R1              ;CHECK VOL CHECK SET
560 034150  001003                              BNE     15$                     ;YES-SKIP
561 034152  012703  010551                      MOV     #MVOLCK,R3              ;ELSE SET NAME MESSAGE PTR
562 034156  000741                              BR      9$                      ;GO REPORT
563 034160  032767  040000  146656      15$:    BIT     #DRVERR,T.CS            ;TEST DRIVE ERROR SET
564 034166  001003                              BNE     16$                     ;YES-SKIP
565 034170  012703  010526                      MOV     #MDRERR,R3              ;ELSE SET NAME MESSAGE PTR
566 034174  000732                              BR      9$                      ;GO REPORT
567 034176  032701  020000              16$:    BIT     #WLSTAT,R1              ;CHECK WRITE LOCK STATUS
568 034202  001406                              BEQ     17$                     ;SKIP IF RESET
569 034204  012703  010610                      MOV     #MWLSTA,R3              ;ELSE SET NAME MESSAGE PTR
570 034210                                      ERRHRD  705.,,ERR2
    034210  104456                              TRAP    C$ERHRD
    034212  001301                              .WORD   705
    034214  000000                              .WORD   0
    034216  012532                              .WORD   ERR2
571 034220  042701  021177              17$:    BIC     #21177,R1               ;CLEAR STAUS EXCEPT FOR ERROR BITS
572 034224  026727  146046  000001              CMP     T.DRIVE,#1
573 034232  001404                              BEQ     99$
574 034234  022701  000200                      CMP     #200,R1
575 034240  001411                              BEQ     19$
576 034242  000402                              BR      18$
577 034244  005701                      99$:    TST     R1
578 034246  001406                              BEQ     19$                     ;NO-SKIP
579 034250                              18$:    ERRHRD  704.,,ERR6              ;ELSE REPORT ALL ERRORS
    034250  104456                              TRAP    C$ERHRD
    034252  001300                              .WORD   704
    034254  000000                              .WORD   0
    034256  012766                              .WORD   ERR6
580 034260                                      EXIT    TST                     ;EXIT
    034260  104432                              TRAP    C$EXIT
    034262  000016                              .WORD   L10035-.
581 034264  016701  146554              19$:    MOV     T.CS,R1                 ;GET CS REG
582 034270  042701  141777                      BIC     #141777,R1              ;CLEAR ALL BUT ERROR BITS
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034274  005701                          TST     R1              ;TEST IF ANY ERROR SET
034276  001364                          BNE     18$             ;YES-SKIP TO REPORT
034300                          25$:
034300                          100$:
034300                          ENDTST
034300                          L10035:
034300  104401                          TRAP    C$ETST




                                .SBTTL  *TEST 8         INITIAL RESET STATE
034302                          BGNTST                  ;TEST 8
034302                                                                  T8::
034302  012767  006515  146502          MOV     #INITST,ERHEAD
034310  004767  162514                  JSR     PC,TSTINT       ;INITIALIZE TEST

034314  004767  162526                  JSR     PC,GSTATR       ;GET STATUS WITH RESET
034320  034366                          65$
034322  005767  160000                  TST     MISWIW          ;CHECK IF MAN INTERVENTION WAS RUN
034326  100017                          BPL     4$              ;NO-SKIP
034330  005767  147024                  TST     PASNUM          ;CHECK IF 1ST PASS
034334  001014                          BNE     4$              ;NO-SKIP
034336  032767  000100  146506          BIT     #HSSTAT,T.MP    ;CHECK HD SELECT STILL 0
034344  001410                          BEQ     4$              ;YES-SKIP
034346  012703  010537                  MOV     #MHSTA,R3       ;SET NAME MESSAGE PTR
034352  012704  011412                  MOV     #CCYLUP,R4      ;SET CONDITION POINTER
034356                                  ERRHRD  801.,,ERR4      ;REPORT ERROR
034356  104456                          TRAP    C$ERHRD
034360  001441                          .WORD   801
034362  000000                          .WORD   0
034364  012646                          .WORD   ERR4
034366                          4$:
034366                          65$:
034366                          ENDTST
034366                          L10036:
034366  104401                          TRAP    C$ETST




                                .SBTTL  *TEST 9         DRIVE READY
034370                          BGNTST                  ;TEST 9
034370                                                                  T9::
034370  012767  006543  146414          MOV     #T09ERR,ERHEAD  ;SET ERROR HEADER
034376  012701  003102                  MOV     #NEWCYL,R1      ;GET POINTER TO DESIRED LOC
034402  005021                          CLR     (R1)+           ;CLEAR NEW CYL
034404  005021                          CLR     (R1)+           ;CLEAR CURRENT CYL
034406  005021                          CLR     (R1)+           ;       DIFFERENCE
034410  005011                          CLR     (R1)            ;       SIGN
034412  004767  162412                  JSR     PC,TSTINT       ;INITIALIZE TEST
034416  004767  162424                  JSR     PC,GSTATR       ;GET STATUS WITH RESET
034422  035022                          100$
034424  004767  166170                  JSR     PC,POSHSB       ;POSITION HEAD SELECTED BIT
034430  010567  146456                  MOV     R5,DESHD        ;STORE AS DESIRED HEAD
034434  004767  164512                  JSR     PC,SIMSEK       ;EXECUTE SIMPLE SEEK
034440  035022                          100$
034442  012703  010404                  MOV     #MDRDY,R3       ;SET NAME MESSAGE PTR
034446  012704  011353                  MOV     #CDRDY,R4       ;SET CONDITION POINTER
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    630 034452  004767  162420                  JSR     PC,GSTAT        ;GET STATUS
    631 034456  035022                          100$
    632 034460  032767  000001  146356          BIT     #DRDYMSK,T.CS   ;TEST READY SET
    633 034466  001406                          BEQ     4$              ;NO-SKIP
    634 034470                                  ERRHRD  901.,,ERR4      ;REPORT READY ERROR
        034470  104456                          TRAP    C$ERHRD
        034472  001605                          .WORD   901
        034474  000000                          .WORD   0
        034476  012646                          .WORD   ERR4
    635 034500                                  EXIT    TST             ;EXIT
        034500  104432                          TRAP    C$EXIT
        034502  000320                          .WORD   L10037-.
    636 034504  012701  000121          4$:     MOV     #81.,R1         ;SET WAIT COUNT
    637 034510  004767  162362          5$:     JSR     PC,GSTAT        ;GET STATUS
    638 034514  035022                          100$
    639 034516                                  BREAK                   ;ALLOW FOR A ^C
        034516  104422                          TRAP    C$BRK
    640
    641 034520  012703  000005                  MOV     #5,R3           ;SET EXPECTED STATE VALUE
    642 034524  026703  146330                  CMP     T.STAT,R3       ;CHECK STATE IS 5
    643 034530  001406                          BEQ     7$              ;YES-SKIP
    644 034532                                  ERRHRD  902.,,ERR7      ;ELSE REPORT
        034532  104456                          TRAP    C$ERHRD
        034534  001606                          .WORD   902
        034536  000000                          .WORD   0
        034540  013666                          .WORD   ERR7
    645 034542                                  EXIT    TST
        034542  104432                          TRAP    C$EXIT
        034544  000256                          .WORD   L10037-.
    646 034546  012703  010404          7$:     MOV     #MDRDY,R3
    647 034552  032767  000001  146264          BIT     #DRDYMSK,T.CS   ;CHECK READY SET
    648 034560  001063                          BNE     12$             ;YES-SKIP
    649 034562  005301                          DEC     R1              ;ELSE DEC WAIT COUNT
    650 034564  001453                          BEQ     9$              ;SKIP IF 0
    651 034566                                  TIMDLY  1
    652 034712  000676                          BR      5$
    653 034714                          9$:     ERRHRD  903.,,ERR5      ;REPORT READY ERROR
        034714  104456                          TRAP    C$ERHRD
        034716  001607                          .WORD   903
        034720  000000                          .WORD   0
        034722  012716                          .WORD   ERR5
    654 034724                                  EXIT    TST
        034724  104432                          TRAP    C$EXIT
        034726  000074                          .WORD   L10037-.
    655
    656 034730  005767  146110          12$:    TST     T.CS            ;TEST IF ANY ERROR
    657 034734  100006                          BPL     15$             ;NO-SKIP
    658 034736                                  ERRHRD  904.,,ERR6
        034736  104456                          TRAP    C$ERHRD
        034740  001610                          .WORD   904
        034742  000000                          .WORD   0
        034744  012766                          .WORD   ERR6
    659 034746                                  EXIT    TST
        034746  104432                          TRAP    C$EXIT
        034750  000052                          .WORD   L10037-.
    660 034752  012703  010537          15$:    MOV     #MHSTA,R3       ;SET NAME MESSAGE PTR
    661 034756  004767  165636                  JSR     PC,POSHSB       ;POSITION HEAD SELECT BIT FOR TEST
    662 034762  020567  146124                  CMP     R5,DESHD        ;CHECK IF CORRECT HEAD SELECTED
    663 034766  001415                          BEQ     20$             ;YES-SKIP
    664 034770  005767  146116                  TST     DESHD           ;ELSE TEST IF 1 DESIRED
    665 034774  001406                          BEQ     17$             ;NO-REPORT SB 0
    666 034776                                  ERRHRD  905.,,ERR3      ;ELSE REPORT SB 1
        034776  104456                          TRAP    C$ERHRD
        035000  001611                          .WORD   905
        035002  000000                          .WORD   0
        035004  012600                          .WORD   ERR3
    667 035006                                  EXIT    TST
        035006  104432                          TRAP    C$EXIT
        035010  000012                          .WORD   L10037-.
    668 035012                          17$:    ERRHRD  906.,,ERR2
        035012  104456                          TRAP    C$ERHRD
        035014  001612                          .WORD   906
        035016  000000                          .WORD   0
        035020  012532                          .WORD   ERR2
    669 035022                          20$:
    670 035022                          100$:
    671 035022                          ENDTST
        035022                          L10037:
        035022  104401                          TRAP    C$ETST
    672
    673
    674
    675                                 .SBTTL  *TEST 10        SEEK SIGN SWITCH
    676 035024                          BGNTST                  ;TEST 10
        035024                                                                          T10::
    677 035024  012767  006553  145760          MOV     #T10ERR,ERHEAD  ;SET ERROR HEADER
    678 035032  012701  003102                  MOV     #NEWCYL,R1
    679 035036  005021                          CLR     (R1)+           ;CLEAR NEW CYL
    680 035040  005021                          CLR     (R1)+           ;CLEAR CURRENT CYLINDER
    681 035042  005021                          CLR     (R1)+           ;CLEAR DIFFERENCE
    682 035044  052721  000001                  BIS     #BIT0,(R1)+     ;SET FOR SIGN OF 1
    683 035050  004767  165544                  JSR     PC,POSHSB       ;GET SELECTED HEAD
    684 035054  010521                          MOV     R5,(R1)+        ;SET AS DESIRED HEAD
    685 035056                          T104$:
    686 035056                          BGNSUB
        035056                                                                          T10.1:
        035056  104402                          TRAP    C$BSUB
    687 035060  004767  161744                  JSR     PC,TSTINT       ;INITIALIZE TEST
    688 035064  004767  161756                  JSR     PC,GSTATR       ;GET STATUS
    689 035070  035460                          60$
    690 035072  004767  164054                  JSR     PC,SIMSEK       ;DO SEEK
    691 035076  035460                          60$
    692 035100  012703  010404                  MOV     #MDRDY,R3       ;SET NAME MESSAGE PTR
    693 035104  012704  011353                  MOV     #CDRDY,R4       ;SET CONDITION MESSAGE PTR
    694 035110  004767  161762                  JSR     PC,GSTAT        ;GET STATUS
    695 035114  035460                          60$
    696 035116  032767  000001  145720          BIT     #DRDYMSK,T.CS   ;CHECK READY RESET
    697 035124  001406                          BEQ     4$              ;YES-SKIP
    698 035126                                  ERRHRD  1001.,,ERR4     ;REPORT READY ERROR
        035126  104456                          TRAP    C$ERHRD
        035130  001751                          .WORD   1001
        035132  000000                          .WORD   0
        035134  012646                          .WORD   ERR4
    699 035136                                  EXIT    SUB             ;EXIT SUBTEST
    035136  104432                            TRAP    C$EXIT
    035140  000320                            .WORD   L10041-.
700
701
702 035142  012701  000121           4$:      MOV     #81.,R1             ;SET WAIT COUNT
703 035146  004767  161724           5$:      JSR     PC,GSTAT            ;GET STATUS
704 035152  035460                            60$
705 035154                                    BREAK                       ;ALLOW FOR A ^C
    035154  104422                            TRAP    C$BRK
706
707 035156  012703  000005                    MOV     #5,R3               ;SET EXPECTED STATE
708 035162  020367  145672                    CMP     R3,T.STAT           ;CHECK STATE IS 5
709 035166  001406                            BEQ     7$                  ;YES-SKIP
710 035170                                    ERRHRD  1002.,,ERR7         ;REPORT STATE ERROR
    035170  104456                            TRAP    C$ERHRD
    035172  001752                            .WORD   1002
    035174  000000                            .WORD   0
    035176  013666                            .WORD   ERR7
711 035200                                    EXIT    SUB                 ;EXIT
    035200  104432                            TRAP    C$EXIT
    035202  000256                            .WORD   L10041-.
712 035204  012703  010404           7$:      MOV     #MDRDY,R3           ;SET NAME MESSAGE PTR
713 035210  032767  000001  145626            BIT     #DRDYMSK,T.CS       ;CHECK READY SET
714 035216  001063                            BNE     12$                 ;YES-SKIP
715 035220  005301                            DEC     R1                  ;DO WAIT COUNT
716 035222  001453                            BEQ     9$                  ;SKIP IF 0
717 035224                                    TIMDLY  1
718 035350  000676                            BR      5$
719
720 035352                           9$:      ERRHRD  1003.,,ERR5         ;REPORT READY ERROR
    035352  104456                            TRAP    C$ERHRD
    035354  001753                            .WORD   1003
    035356  000000                            .WORD   0
    035360  012716                            .WORD   ERR5
721 035362                                    EXIT    SUB                 ;EXIT
    035362  104432                            TRAP    C$EXIT
    035364  000074                            .WORD   L10041-.
722 035366  005767  145452           12$:     TST     T.CS                ;TEST IF ANY OTHER ERROR
723 035372  100006                            BPL     15$                 ;NO-SKIP
724 035374                                    ERRHRD  1004.,,ERR6         ;REPORT ALL ERRORS
    035374  104456                            TRAP    C$ERHRD
    035376  001754                            .WORD   1004
    035400  000000                            .WORD   0
    035402  012766                            .WORD   ERR6
725 035404                                    EXIT    SUB                 ;EXIT
    035404  104432                            TRAP    C$EXIT
    035406  000052                            .WORD   L10041-.
726
727 035410  012703  010537           15$:     MOV     #MHSTA,R3           ;SET NAME MESSAGE PTR
728 035414  004767  165200                    JSR     PC,POSHSB           ;GET SELECTED HEAD BIT
729 035420  020567  145466                    CMP     R5,DESHD            ;CHECK IF CORRECT
730 035424  001415                            BEQ     20$                 ;YES - SKIP
731 035426  005767  145460                    TST     DESHD               ;WAS IT SET
732 035432  001406                            BEQ     17$                 ;NO-SKIP
733 035434                                    ERRHRD  1005.,,ERR3         ;REPORT SB 1
    035434  104456                            TRAP    C$ERHRD
    035436  001755                            .WORD   1005
```

```
035440  000000                          .WORD   0
035442  012600                          .WORD   ERR3
035444                                  EXIT    SUB
035444  104432                          TRAP    C$EXIT
035446  000012                          .WORD   L10041-.
035450                          17$:    ERRHRD  1006.,,ERR2     ;REPORT SB 0
035450  104456                          TRAP    C$ERHRD
035452  001756                          .WORD   1006
035454  000000                          .WORD   0
035456  012532                          .WORD   ERR2

035460                          20$:
035460                          60$:
035460                          ENDSUB
035460                          L10041:
035460  104403                          TRAP    C$ESUB
035462  005767  145422                  TST     DESSGN          ;CHECK IF BOTH SIGN USED
035466  001404                          BEQ     25$             ;YES-SKIP
035470  005067  145414                  CLR     DESSGN          ;SET FOR SIGN OF 0
035474  000167  177356                  JMP     T104$           ;DO TEST AGAIN
035500                          25$:
035500                          ENDTST
035500                          L10040:
035500  104401                          TRAP    C$ETST




                                .SBTTL  *TEST 11        HEAD ALIGNMENT SUPPORT
035502                          BGNTST                  ;TEST 11
035502                                                                          T11::
035502  032767  000010  156616          BIT     #HDALIGN,MISWIW ;CHECK IF RUN HEAD ALIGNMENT
035510  001411                          BEQ     1$              ;NO-EXIT
035512  005767  145642                  TST     PASNUM          ;TEST IF PASS 0
035516  001006                          BNE     1$              ;NO-EXIT
035520  026767  145306  145262          CMP     RLDRV,HADONE    ;TEST IF HEAD ALIGN DONE THIS DRIVE
035526  001004                          BNE     2$              ;NO - SKIP
035530  000167  000422                  JMP     T115$           ;GO CHECK WRITE LOCK
035534                          1$:     EXIT    TST
035534  104432                          TRAP    C$EXIT
035536  000520                          .WORD   L10042-.
035540  016767  145266  145242  2$:     MOV     RLDRV,HADONE    ;SET HEAD ALIGN DONE FLAG
                                                                ;TELL DRV AND CNTRL HD ALIGN TO BE DONE ON
035546                                  PRINTF  #FMT5,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
035546  005046                          CLR     -(SP)
035550  156716  145257                  BISB    RLDRV+1,(SP)
035554  012746  006053                  MOV     #DRVNAM,-(SP)
035560  016746  145242                  MOV     RLBAS,-(SP)
035564  012746  006042                  MOV     #BASADD,-(SP)
035570  012746  011567                  MOV     #FMT5,-(SP)
035574  012746  000005                  MOV     #5,-(SP)
035600  010600                          MOV     SP,R0
035602  104417                          TRAP    C$PNTF
035604  062706  000014                  ADD     #14,SP
                                                                ;HD ALIGN. RSETWRT LCK TO SEL HD 0, SET HD 1
035610                                  PRINTF  #FMT9,#HAMES1
035610  012746  007154                  MOV     #HAMES1,-(SP)
035614  012746  011753                  MOV     #FMT9,-(SP)
```

```
      035620  012746  000002                      MOV     #2,-(SP)
      035624  010600                              MOV     SP,R0
      035626  104417                              TRAP    C$PNTF
      035630  062706  000006                      ADD     #6,SP
 764                                                                      ;^C TO RET TO SUPVR CMD MODE
 765  035634                                      PRINTF  #FMT9,#HAMES2
      035634  012746  007237                      MOV     #HAMES2,-(SP)
      035640  012746  011753                      MOV     #FMT9,-(SP)
      035644  012746  000002                      MOV     #2,-(SP)
      035650  010600                              MOV     SP,R0
      035652  104417                              TRAP    C$PNTF
      035654  062706  000006                      ADD     #6,SP
 766                                                                      ;IF HD SEL TP  (21, 22) DO NOT EXIST
 767  035660                                      PRINTF  #FMT9,#HAMES3
      035660  012746  007343                      MOV     #HAMES3,-(SP)
      035664  012746  011753                      MOV     #FMT9,-(SP)
      035670  012746  000002                      MOV     #2,-(SP)
      035674  010600                              MOV     SP,R0
      035676  104417                              TRAP    C$PNTF
      035700  062706  000006                      ADD     #6,SP
 768                                                                      ;JUMPER DRV RDY AND SEEK INCOMPLETE ON DRV
 769                                                                      ;LOGIC MOD
 770  035704                                      PRINTF  #FMT9,#HAMES4
      035704  012746  007406                      MOV     #HAMES4,-(SP)
      035710  012746  011753                      MOV     #FMT9,-(SP)
      035714  012746  000002                      MOV     #2,-(SP)
      035720  010600                              MOV     SP,R0
      035722  104417                              TRAP    C$PNTF
      035724  062706  000006                      ADD     #6,SP
 771                                                                      ;SET WRITE LOCK
 772  035730                                      PRINTF  #FMTOP1,#OPR12A,#OPR1A,#BASADD,RLBAS,#DRVNAM,<B,RLDRV+1>
      035730  005046                              CLR     -(SP)
      035732  156716  145075                      BISB    RLDRV+1,(SP)
      035736  012746  006053                      MOV     #DRVNAM,-(SP)
      035742  016746  145060                      MOV     RLBAS,-(SP)
      035746  012746  006042                      MOV     #BASADD,-(SP)
      035752  012746  010135                      MOV     #OPR1A,-(SP)
      035756  012746  010121                      MOV     #OPR12A,-(SP)
      035762  012746  011442                      MOV     #FMTOP1,-(SP)
      035766  012746  000007                      MOV     #7,-(SP)
      035772  010600                              MOV     SP,R0
      035774  104417                              TRAP    C$PNTF
      035776  062706  000020                      ADD     #20,SP
 773
 774  036002                              BGNSUB
      036002                                                                                T11.1:
      036002  104402                              TRAP    C$BSUB
 775  036004  004767  161020                      JSR     PC,TS$INT       ;INITIALIZE TEST
 776  036010  005067  144772              11$:    CLR     DONE            ;CLEAR DONE
 777
 778  036014  016767  145012  145012              MOV     RLDRV,L.CS      ;SET UP FOR GET STATUS
 779  036022  052767  000104  145004              BIS     #GTSTAT,L.CS
 780  036030  012767  000013  145002              MOV     #GETSTAT!DRSET,L.DA
 781
 782  036036  016762  144776  000004              MOV     L.DA,RLDA(R2)   ;DO GET STATUS
 783  036044  016762  144764  000000              MOV     L.CS,RLCSR(R2)
 784
 785
 786 036052  005767  144730          13$:    TST     DONE              ;CHECK IF DONE
 787 036056  001775                          BEQ     13$               ;NO-GO CLR CONTROLLER
 788
 789 036060  005067  144722                  CLR     DONE
 790 036064  012767  000021  144746  20$:    MOV     #HDSEL!MBSETO,L.DA;LOAD FOR HEAD 1
 791 036072  000240                          NOP
 792 036074  032767  020000  144750          BIT     #WLSTAT,T.MP      ;CHECK IF WRITE LOCK SET
 793 036102  001003                          BNE     22$               ;YES-SKIP
 794 036104  042767  000020  144726          BIC     #HDSEL,L.DA       ;ELSE CLEAR TO HEAD 0
 795 036112  016767  144714  144714  22$:    MOV     RLDRV,L.CS        ;LOAD IN DRIVE NUMBER
 796 036120  052767  000106  144706          BIS     #SEEK,L.CS        ;SET FOR SEEK
 797 036126  016762  144706  000004          MOV     L.DA,RLDA(R2)     ;LOAD & EXECUTE SEEK
 798 036134  016762  144674  000000          MOV     L.CS,RLCSR(R2)
 799 036142                                  BREAK                     ;ALLOW OPERATOR TO INTERRUPT PROGRAM TO GET
     036142  104422                          TRAP    C$BRK
 800                                                                   ;/BACK TO SUPERVISOR COMMAND MODE
 801 036144  005767  144636          30$:    TST     DONE
 802 036150  001775                          BEQ     30$
 803 036152  000716                          BR      11$               ;LOOP
 804 036154                          59$:
 805 036154                          ENDSUB
     036154                          L10043:
     036154  104403                          TRAP    C$ESUB
 806 036156                          T115$:
 807 036156                          BGNSUB
     036156                                                                            T11.2:
     036156  104402                          TRAP    C$BSUB
 808 036160  004767  160644                  JSR     PC,TSTINT         ;INITIALIZE TEST
 809 036164  004767  160656                  JSR     PC,GSTATR         ;CLEAR DRIVE
 810 036170  036254                          60$
 811 036172  032767  020000  144652          BIT     #WLSTAT,T.MP      ;CHECK WRITE LOCK RESET
 812 036200  001425                          BEQ     19$               ;YES-SKIP
 813 036202                          18$:    PRINTF  #FMT9,#OPR12      ;REQUEST WRITE LOCK RESET
     036202  012746  010102                  MOV     #OPR12,-(SP)
     036206  012746  011753                  MOV     #FMT9,-(SP)
     036212  012746  000002                  MOV     #2,-(SP)
     036216  010600                          MOV     SP,R0
     036220  104417                          TRAP    C$PNTF
     036222  062706  000006                  ADD     #6,SP
 814 036226  005067  146132                  CLR     OBUFF             ;CLEAR FOR RESPONSE
 815 036232                                  GMANIL  OPR002,OBUFF,1,NO         ;GET RESPONSE
     036232  104443                          TRAP    C$GMAN
     036234  000404                          BR      10000$
     036236  004364                          .WORD   OBUFF
     036240  000120                          .WORD   T$CODE
     036242  007470                          .WORD   OPR002
     036244  000001                          .WORD   1
     036246                          10000$:
 816 036246  005767  146112                  TST     OBUFF             ;WAS ANSWER YES
 817 036252  001753                          BEQ     18$               ;NO-REPEAT REQUEST
 818 036254                          19$:
 819 036254                          60$:
 820 036254                          ENDSUB
     036254                          L10044:
     036254  104403                          TRAP    C$ESUB
 821 036256                          20$:
```

```
822 036256                              ENDTST
    036256                              L10042:
    036256  104401                              TRAP    C$ETST
823
824
825
826                                     .SBTTL  *TEST 12        HEAD SWITCHING
827 036260                              BGNTST                  ;TEST 12
    036260                                                                              T12::
828 036260  012767  006573  144524              MOV     #T12ERR,ERHEAD  ;SET ERROR HEADER
829 036266  012701  003102                      MOV     #NEWCYL,R1      ;GET POINTER TO DESIRED LOCATION
830 036272  005021                              CLR     (R1)+           ;CLEAR NEW CYLINDER
831 036274  005021                              CLR     (R1)+           ;CLEAR CURRENT CYL.
832 036276  005021                              CLR     (R1)+           ;CLEAR DIFFERENCE
833 036300  005021                              CLR     (R1)+           ;CLEAR SIGN
834 036302  012721  000001                      MOV     #1,(R1)+        ;SET FOR HEAD 1
835 036306                              T124$:
836 036306                              BGNSUB
    036306                                                                              T12.1:
    036306  104402                              TRAP    C$BSUB
837 036310  004767  160514                      JSR     PC,TSTINT       ;INITIALIZE TEST
838 036314  004767  160526                      JSR     PC,GSTATR       ;GET STATUS WITH RESET
839 036320  036710                              60$
840 036322  004767  162624                      JSR     PC,SIMSEK       ;DO SEEK
841 036326  036710                              60$
842 036330  012703  010404                      MOV     #MDRDY,R3       ;SET NAME MESSAGE PTR
843 036334  012704  011353                      MOV     #CDRDY,R4       ;SET CONDITION POINTER
844 036340  004767  160532                      JSR     PC,GSTAT        ;GET STATUS
845 036344  036710                              60$
846 036346  032767  000001  144470              BIT     #DRDYMSK,T.CS   ;CHECK IF READY
847 036354  001406                              BEQ     5$              ;NO-SKIP
848 036356                                      ERRHRD  1201.,,ERR4     ;REPORT READY ERROR
    036356  104456                              TRAP    C$ERHRD
    036360  002261                              .WORD   1201
    036362  000000                              .WORD   0
    036364  012646                              .WORD   ERR4
849 036366                                      EXIT    SUB             ;EXIT
    036366  104432                              TRAP    C$EXIT
    036370  000320                              .WORD   L10046-.
850
851 036372  012701  000121              5$:     MOV     #81.,R1         ;SET WAIT COUNT
852 036376  004767  160474              6$:     JSR     PC,GSTAT        ;GET STATUS
853 036402  036710                              60$
854 036404                                      BREAK                   ;ALLOW FOR A ^C
    036404  104422                              TRAP    C$BRK
855
856 036406  012703  000005                      MOV     #5,R3           ;SET EXPECTED STATE VALUE
857 036412  020367  144442                      CMP     R3,T.STAT       ;CHECK IF STATE IS 5
858 036416  001406                              BEQ     7$              ;YES-SKIP
859 036420                                      ERRHRD  1202.,,ERR7     ;REPORT STATE ERROR
    036420  104456                              TRAP    C$ERHRD
    036422  002262                              .WORD   1202
    036424  000000                              .WORD   0
    036426  013666                              .WORD   ERR7
860 036430                                      EXIT    SUB
    036430  104432                              TRAP    C$EXIT
    036432  000256                              .WORD   L10046-.
```

```
 861
 862 036434  012703  010404          7$:      MOV     #MDRDY,R3          ;SET NAME MESSAGE PTR
 863 036440  032767  000001  144376           BIT     #DRDYMSK,T.CS      ;CHECK DRIVE READY
 864 036446  001063                           BNE     12$                ;YES-SKIP
 865 036450  005301                           DEC     R1                 ;DEC WAIT COUNT
 866 036452  001453                           BEQ     9$                 ;SKIP IF 0
 867 036454                                   TIMDLY  1
 868 036600  000676                           BR      6$
 869
 870 036602                          9$:      ERRHRD  1203.,,ERR5        ;REPORT READY ERROR
     036602  104456                           TRAP    C$ERHRD
     036604  002263                           .WORD   1203
     036606  000000                           .WORD   0
     036610  012716                           .WORD   ERR5
 871 036612                                   EXIT    SUB                ;EXIT
     036612  104432                           TRAP    C$EXIT
     036614  000074                           .WORD   L10046-.
 872
 873 036616  005767  144222          12$:     TST     T.CS               ;TEST IF ANY ERROR
 874 036622  100006                           BPL     15$                ;NO-SKIP
 875 036624                                   ERRHRD  1204.,,ERR6        ;REPORT ALL ERRORS
     036624  104456                           TRAP    C$ERHRD
     036626  002264                           .WORD   1204
     036630  000000                           .WORD   0
     036632  012766                           .WORD   ERR6
 876 036634                                   EXIT    SUB
     036634  104432                           TRAP    C$EXIT
     036636  000052                           .WORD   L10046-.
 877 036640  012703  010537          15$:     MOV     #MHSTA,R3          ;SET NAME MESSAGE PTR
 878 036644  004767  163750                   JSR     PC,POSHSB          ;POSITION HEAD SELECT BIT
 879 036650  026705  144236                   CMP     DESHD,R5           ;CHECK IF CORRECT HEAD SELECTED
 880 036654  001415                           BEQ     20$                ;YES-SKIP
 881 036656  005767  144230                   TST     DESHD              ;WAS HEAD 0 SELECTED
 882 036662  001406                           BEQ     17$                ;YES-SKIP
 883 036664                                   ERRHRD  1205.,,ERR3        ;REPORT HEAD SB 1
     036664  104456                           TRAP    C$ERHRD
     036666  002265                           .WORD   1205
     036670  000000                           .WORD   0
     036672  012600                           .WORD   ERR3
 884 036674                                   EXIT    SUB                ;EXIT
     036674  104432                           TRAP    C$EXIT
     036676  000012                           .WORD   L10046-.
 885 036700                          17$:     ERRHRD  1206.,,ERR2        ;ELSE REPORT HEAD SB 0
     036700  104456                           TRAP    C$ERHRD
     036702  002266                           .WORD   1206
     036704  000000                           .WORD   0
     036706  012532                           .WORD   ERR2
 886
 887 036710                          20$:
 888 036710                          60$:
 889 036710                          ENDSUB
     036710                          L10046:
     036710  104403                           TRAP    C$ESUB
 890 036712  005767  144174                   TST     DESHD              ;CHECK IF HD 0 WAS DONE
 891 036716  001404                           BEQ     25$                ;YES-SKIP
 892 036720  005067  144166                   CLR     DESHD              ;ELSE SET TO HEAD 0
 893 036724  000167  177356                   JMP     T124$              ;REDO TEST
```

```
036730                                  25$:
036730                                  ENDTST
036730                                  L10045:
036730  104401                                  TRAP    C$ETST



                                        .SBTTL  *TEST 13         READ HEADER (PART 1)
036732                                  BGNTST                   ;TEST 13
036732                                                                            T13::
036732  012767  006605  144052                  MOV     #T13ERR,ERHEAD  ;SET ERROR HEADER
036740  012701  003102                          MOV     #NEWCYL,R1      ;GET ADDRESS OF DESIRED LOCATIONS
036744  005021                                  CLR     (R1)+           ;CLEAR NEW CYL
036746  005021                                  CLR     (R1)+           ;CLEAR CURRENT CYL
036750  005021                                  CLR     (R1)+           ;CLEAR DIFF
036752  005021                                  CLR     (R1)+           ;CLEAR SIGN
036754  005021                                  CLR     (R1)+           ;CLEAR HEAD
036756                                  T134$:
036756                                  BGNSUB
036756                                                                            T13.1:
036756  104402                                  TRAP    C$BSUB
036760  004767  160044                          JSR     PC,TSTINT       ;INITIALIZE TEST
036764  004767  160056                          JSR     PC,GSTATR       ;GET STATUS W/RESET
036770  037062                                  60$
036772  004767  162154                          JSR     PC,SIMSEK       ;DO SEEK
036776  037062                                  60$
037000  012701  000121                          MOV     #81.,R1         ;SET WAIT COUNT
037004  004767  163640                          JSR     PC,RDYWAIT      ;WAIT FOR READY
037010  037062                                  60$

037012  004767  163112                          JSR     PC,XRDHDC       ;DO READ HEADER
037016  037062                                  60$
037020  012703  010537                          MOV     #MHSTA,R3       ;SET NAME MESSAGE PTR
037024  004767  163562                          JSR     PC,POSHW1       ;POSITION HS BIT IN HD WRD 1
037030  020567  144056                          CMP     R5,DESHD        ;CHECK IF HEAD CORRECT
037034  001412                                  BEQ     15$             ;YES-SKIP
037036                                          ERRHRD  1301.,,ERR3     ;REPORT SB 1
037036  104456                                  TRAP    C$ERHRD
037040  002425                                  .WORD   1301
037042  000000                                  .WORD   0
037044  012600                                  .WORD   ERR3
037046                                          EXIT    SUB
037046  104432                                  TRAP    C$EXIT
037050  000012                                  .WORD   L10050-.
037052                                  17$:    ERRHRD  1302.,,ERR2     ;REPORT SB 0
037052  104456                                  TRAP    C$ERHRD
037054  002426                                  .WORD   1302
037056  000000                                  .WORD   0
037060  012532                                  .WORD   ERR2

037062                                  15$:
037062                                  60$:
037062                                  ENDSUB
037062                                  L10050:
037062  104403                                  TRAP    C$ESUB
037064  005767  144022                          TST     DESHD           ;TEST IF HEAD 1 DONE
037070  001007                                  BNE     20$             ;YES-SKIP
```

```
 934 037072  012767  000001  144012          MOV     #1,DESHD        ;ELSE SET TO HEAD 1
 935 037100  016767  143746  144010          MOV     HDWRD1,TEMPO    ;STORE HDR WORD 1
 936 037106  000723                          BR      T134$           ;DO TEST AGAIN
 937 037110  042767  000177  144000  20$:    BIC     #177,TEMPO      ;CLEAR ALL BUT CYLINDER IN 1ST HEADER
 938 037116  042767  000177  143726          BIC     #177,HDWRD1     ;CLEAR ALL BY CYL IN 2ND HEADER
 939 037124  026767  143766  143720          CMP     TEMPO,HDWRD1    ;COMPARE IF EQUAL
 940 037132  001406                          BEQ     22$             ;YES-SKIP
 941 037134  012703  007070                  MOV     #CYLPER,R3      ;SET NAME MESSAGE PTR
 942 037140                                  ERRHRD  1306.,,ERR1     ;REPORT HEAD ALIGNMENT PROBLEM
     037140  104456                          TRAP    C$ERHRD
     037142  002432                          .WORD   1306
     037144  000000                          .WORD   0
     037146  012464                          .WORD   ERR1
 943 037150                          22$:
 944 037150                          ENDTST
     037150                          L10047:
     037150  104401                          TRAP    C$ETST
 945
 946
 947
 948                                 .SBTTL  *TEST 14        READ HEADER (PART 2)
 949 037152                          BGNTST          ;TEST 14
     037152                                                                          T14::
 950 037152  012767  006621  143632          MOV     #T14ERR,ERHEAD  ;SET ERROR HEADER
 951 037160  012701  003104                  MOV     #CURCYL,R1      ;GET ADDRESS OF DESIRED VALUE
 952 037164  005021                          CLR     (R1)+           ;CLEAR CURRENT CYL
 953 037166  005021                          CLR     (R1)+           ;CLEAR DESIRED DIFF
 954 037170  005021                          CLR     (R1)+           ;CLEAR SIGN
 955 037172  005021                          CLR     (R1)+           ;CLEAR DESIRED HEAD
 956 037174                          T153$:
 957 037174                          BGNSUB
     037174                                                                          T14.1:
     037174  104402                          TRAP    C$BSUB
 958 037176  004767  157626                  JSR     PC,TSTINT       ;INITIALIZE TEST
 959 037202  004767  157640                  JSR     PC,GSTATR       ;CLEAR DRIVE
 960 037206  037406                          60$
 961 037210  004767  161736                  JSR     PC,SIMSEK       ;DO SEEK
 962 037214  037406                          60$
 963 037216  012701  000310                  MOV     #200.,R1        ;SET WAIT COUNT FOR 20 MS
 964 037222  004767  163422                  JSR     PC,RDYWAIT      ;WAIT FOR READY
 965 037226  037406                          60$
 966 037230  004767  164114                  JSR     PC,RDALHD       ;DO READ HEADER ALL HEADERS
 967 037234  037406                          60$
 968 037236  005067  143552                  CLR     MORECE          ;CLEAR MORE COMPARE ERRORS FOR REPORT
 969 037242  052767  000002  143534          BIS     #HDRCMP,OPFLAG  ;SET HDR COMPARE FLAG
 970 037250  005003                          CLR     R3              ;CLEAR FOR HDR COUNT
 971 037252  012704  003764                  MOV     #IBUFF,R4       ;GET POINTER FOR HDR TO BE CHECKED
 972 037256  012705  003116                  MOV     #TEMPO,R5       ;GET POINTER TO TEST AREA
 973 037262  012701  000050                  MOV     #40.,R1         ;SET HDR COUNT
 974 037266  011415                          MOV     (R4),(R5)       ;GET FIRST HEADER WORD
 975
 976 037270  042715  000100                  BIC     #HDHSEL,(R5)
 977 037274  005767  143612                  TST     DESHD           ;TEST IF HD 0 DESIRED
 978 037300  001404                          BEQ     10$             ;YES-SKIP
 979 037302  052715  000100                  BIS     #HDHSEL,(R5)    ;ELSE SET HEAD BIT
 980 037306  005065  000002                  CLR     2(R5)           ;CLEAR 2ND WORD OF TEST AREA
 981
```

```
037312  021524                    10$:    CMP     (R5),(R4)+        ;COMPARE HEADER WORD
037314  001406                            BEQ     13$               ;SKIP IF OK
037316  005744                            TST     -(R4)             ;ELSE POSITION R4 TO BAD WORD
037320                                    ERRHRD  1501.,,ERR10      ;REPORT ERROR
037320  104456                            TRAP    C$ERHRD
037322  002735                            .WORD   1501
037324  000000                            .WORD   0
037326  014076                            .WORD   ERR10
037330  005724                            TST     (R4)+             ;BUMP R4 TO NEXT WORD
037332  005203                    13$:    INC     R3                ;BUMP WORD COUNT
037334  005724                            TST     (R4)+             ;TEST 2ND WORD IS 0
037336  001406                            BEQ     15$               ;YES - SKIP
037340  022544                            CMP     (R5)+,-(R4)       ;POSITION PTRS FOR REPORT
037342                                    ERRHRD  1501.,,ERR10      ;REPORT ERROR
037342  104456                            TRAP    C$ERHRD
037344  002735                            .WORD   1501
037346  000000                            .WORD   0
037350  014076                            .WORD   ERR10
037352  024524                            CMP     -(R5),(R4)+       ;REPOSITION POINTER
037354  005724                    15$:    TST     (R4)+             ;POSITION R4 PAST ECC WORD
037356  005203                            INC     R3                ;BUMP WORD COUNT
037360  005215                            INC     (R5)              ;BUMP SECTOR COUNT
037362  011500                            MOV     (R5),R0           ;CHECK IF SECTOR IS PAST LAST SECTOR
037364  042700  177700                    BIC     #^CHDSEC,R0
037370  022700  000050                    CMP     #40.,R0
037374  001002                            BNE     17$               ;NO-SKIP
037376  042715  000077                    BIC     #HDSEC,(R5)       ;ELSE CLEAR SECTOR TO 0
037402  005301                    17$:    DEC     R1                ;DEC HDR COUNT
037404  001342                            BNE     10$               ;YES-SKIP

037406                            60$:
037406                            ENDSUB
037406                            L10052:
037406  104403                            TRAP    C$ESUB
037410  005767  143476                    TST     DESHD             ;CHECK IF HD 1 TESTED
037414  001005                            BNE     20$               ;YES-SKIP
037416  012767  000001  143466            MOV     #1,DESHD          ;ELSE SET TO HEAD 1
037424  000167  177544                    JMP     T153$             ;REDO TEST
037430                            20$:
037430                            ENDTST
037430                            L10051:
037430  104401                            TRAP    C$ETST



                                  .SBTTL  *TEST 15          DIFFERENCE OF 1 SEEK (PART 1)
037432                            BGNTST                    ;TEST 15
037432                                                                              T15::

037432  012767  006645  143352            MOV     #P2T01E,ERHEAD    ;SET ERROR HEADER
037440  012767  000004  143450            MOV     #4,TEMP0          ;SET PASS COUNT
037446  004767  157356                    JSR     PC,TSTINT         ;INITIALIZE TEST
037452  004767  157370                    JSR     PC,GSTATR         ;GET STATUS
037456  040076                            T1765$
037460  022767  000001  142610            CMP     #1,T.DRIVE        ;RL01 OR RL02?
037466  001404                            BEQ     2$                ;BRANCH TO SET UP DIFF ARGUMENT FOR RL01
037470  012767  177776  143424            MOV     #-2,TEMP2         ;ELSE, SET -2 INTO DIFF ARGUMENT FOR RL02
```

```
 1026                                                                      ;/(RL02 HAS DOUBLE THE TRACK DENSITY OF RL01)
 1027 037476 000403                               BR      5$
 1028 037500 012767 177777 143414   2$:           MOV     #-1,TEMP2        ;SET -1 INTO DIFF ARGUMENT FOR -1 SEEK
 1029 037506 012704 003104          5$:           MOV     #CURCYL,R4       ;SET POINTERS
 1030 037512 012705 003102                        MOV     #NEWCYL,R5
 1031 037516 004767 162276                        JSR     PC,CHOSHD        ;GO CHOOSE HEAD
 1032 037522                        T172$:
 1033 037522                        BGNSUB
      037522                                                                           T15.1:
      037522 104402                               TRAP    C$BSUB
 1034 037524 004767 163472                        JSR     PC,GETPOS        ;GET POSITION
 1035 037530 040032                                60$
 1036 037532                                      BREAK                    ;ALLOW FOR A ^C
      037532 104422                               TRAP    C$BRK
 1037
 1038 037534                                      INLOOP                   ;CHECK IF IN ERROR LOOP
      037534 104420                               TRAP    C$INLP
 1039 037536                                      BNCOMPLETE      3$       ;NO - SKIP
      037536 103005                               BCC     3$
 1040 037540 021415                               CMP     (R4),(R5)        ;CHECK IF CURRENT = NEW
 1041 037542 001005                               BNE     4$               ;NO - SKIP
 1042 037544 004767 162334                        JSR     PC,ONSWAP        ;ELSE SWAP OLD AND NEW
 1043 037550 000441                               BR      9$               ;SKIP TO SEEK
 1044 037552 005467 143344          3$:           NEG     TEMP2            ;CHANGE DIFF ARGUMENT FOR OPPOSITE DIR
 1045 037556 011415                 4$:           MOV     (R4),(R5)        ;MOVE CURRENT INTO OLD
 1046 037560 026714 142516                        CMP     HLMTW,(R4)       ;CHECK IF CURRENT AT 255
 1047 037564 001014                               BNE     7$               ;NO - SKIP
 1048 037566 022767 000001 142502                 CMP     #1,T.DRIVE       ;RL01 OR RL02?
 1049 037574 001404                               BEQ     6$               ;BRANCH IF RL01
 1050 037576 012767 177776 143316                 MOV     #-2,TEMP2        ;ELSE, SET UP DIFF ARGUMENT FOR RL02
 1051 037604 000421                               BR      8$
 1052 037606 012767 177777 143306   6$:           MOV     #-1,TEMP2        ;AT MAX CYL, MAKE NEXT SEEK REV
 1053 037614 000415                               BR      8$               ;SKIP
 1054 037616 005714                 7$:           TST     (R4)             ;TEST IF CURRENT AT 0
 1055 037620 001013                               BNE     8$               ;NO - SKIP
 1056 037622 022767 000001 142446                 CMP     #1,T.DRIVE       ;RL01 OR RL02?
 1057 037630 001404                               BEQ     11$              ;BRANCH IF RL01
 1058 037632 012767 000002 143262                 MOV     #2,TEMP2         ;ELSE, SET UP DIFF ARGUMENT FOR RL02
 1059 037640 000403                               BR      8$
 1060 037642 012767 000001 143252   11$:          MOV     #1,TEMP2         ;AT CYL 0, MAKE NEXT SEEK FWRD
 1061 037650 066715 143246          8$:           ADD     TEMP2,(R5)       ;ADD DIFF TO NEW CYL (+1 OR -1 FOR RL01,
 1062                                                                      ;/+2 OR -2 FOR RL02)
 1063 037654                        9$:           BREAK                    ;ALLOW A ^C
      037654 104422                               TRAP    C$BRK
 1064 037656 004767 160500                        JSR     PC,XSEEK         ;DO SEEK
 1065 037662 040032                                60$
 1066 037664 004767 160312                        JSR     PC,GDRSTA        ;GET DRIVE STATE
 1067
 1068 037670 012703 000004                        MOV     #4,R3            ;SET EXPECTED STATE
 1069 037674 020367 143160                        CMP     R3,T.STAT        ;CHECK DRIVE STATE
 1070 037700 001405                               BEQ     10$              ;YES-SKIP
 1071 037702                                      ERRHRD  101.,,ERR7       ;REPORT STATE ERROR
      037702 104456                               TRAP    C$ERHRD
      037704 000145                               .WORD   101
      037706 000000                               .WORD   0
      037710 013666                               .WORD   ERR7
 1072 037712 000442                               BR      16$              ;EXIT TEST
```

```
037714  012703  000005          10$:      MOV     #5,R3           ;SET EXPECTED STATE
037720                                    WAITMS  20.             ;WAIT 20 MS FOR DRIVE STATE CHANGE FROM 4 TO 5
037736  012727  000372                    MOV     #250.,(PC)+
037742  000000                            .WORD   0
037744  016727  142146                    MOV     L$DLY,(PC)+
037750  000000                            .WORD   0
037752  005367  177772                    DEC     -6(PC)
037756  001375                            BNE     .-4
037760  005367  177756                    DEC     -22(PC)
037764  001367                            BNE     .-20
037766  104422                            TRAP    C$BRK
037776  004767  160200                    JSR     PC,GDRSTA       ;GET DRIVE STATE
040002  020367  143052                    CMP     R3,T.STAT       ;IS STATE 5?
040006  001404                            BEQ     16$             ;YES-SKIP
040010                                    ERRHRD  102.,,ERR7      ;REPORT STATE ERROR
040010  104456                            TRAP    C$ERHRD
040012  000146                            .WORD   102
040014  000000                            .WORD   0
040016  013666                            .WORD   ERR7
040020  012701  000062          16$:      MOV     #50.,R1         ;INITIALIZE WAIT COUNT
040024  004767  162620                    JSR     PC,RDYWAIT      ;GO WAIT FOR DRIVE READY
040030  040032                            60$
040032  012767  000002  142756  60$:      MOV     #2,ERRSWI       ;INIT ERROR SWITCH
040040                          ENDSUB
040040                          L10054:
040040  104403                            TRAP    C$ESUB
040042                                    ESCAPE  TST             ;EXIT TEST IF ERROR
040042  104410                            TRAP    C$ESCAPE
040044  000032                            .WORD   L10053-.
040046  005367  143044                    DEC     TEMPO           ;DEC PASS COUNT
040052  001411                            BEQ     24$             ;SKIP IF 0-DONE

040054  032767  000001  143034            BIT     #BIT0,TEMPO     ;TEST IF PASS=2
040062  001003                            BNE     23$             ;NO-SKIP
040064  004767  161754                    JSR     PC,SWAPHD       ;GO SWAP TO HEAD 1 OR END TEST
040070  040076                            24$                     ;ABORT RETURN
040072  000167  177424          23$:      JMP     T172$
040076                          24$:
040076                          T1765$:
040076                          ENDTST
040076                          L10053:
040076  104401                            TRAP    C$ETST



                                .SBTTL    *TEST 16        DIFFERENCE OF 1 SEEK (PART 2)
040100                          BGNTST                    ;TEST 16
040100                                                                            T16::
040100  012767  006645  142704            MOV     #P2T02E,ERHEAD  ;SET ERROR HEADER
040106  012767  000004  143002            MOV     #4,TEMPO        ;SET PASS COUNT
040114  004767  156710                    JSR     PC,TSTINT       ;INITIALIZE TEST
040120  004767  156722                    JSR     PC,GSTATR       ;GET STATUS, CLEAR DRIVE
040124  040372                            T1865$
040126  004767  161666                    JSR     PC,CHOSHD       ;GO CHOOSE HEAD
040132  012767  177777  142762            MOV     #-1,TEMP2       ;SET DIFF ARGUMENT TO -1 (REVERSE)
040140  012703  003102                    MOV     #NEWCYL,R3      ;GET ADDRESSES
040144  012704  003104                    MOV     #CURCYL,R4
```

```
 1110 040150  012705  003100                   MOV     #OLDCYL,R5
 1111 040154                          T187$:
 1112 040154                          BGNSUB
      040154                                                                        T16.1:
      040154  104402                           TRAP    C$BSUB
 1113 040156  004767  163040                   JSR     PC,GETPOS       ;GET CURRENT POSITION
 1114 040162  040330                           60$
 1115 040164                                   BREAK                   ;ALLOW FOR A ^C
      040164  104422                           TRAP    C$BRK
 1116
 1117 040166                                   INLOOP                  ;CHECK IF IN ERROR LOOP
      040166  104420                           TRAP    C$INLP
 1118 040170                                   BNCOMPLETE      3$      ;NO - SKIP
      040170  103005                           BCC     3$
 1119 040172  021413                           CMP     (R4),(R3)       ;CHECK IF CURRENT = NEW
 1120 040174  001005                           BNE     4$              ;NO - SKIP
 1121 040176  004767  161702                   JSR     PC,ONSWAP       ;ELSE SWAP OLD AND NEW
 1122 040202  000421                           BR      9$              ;SKIP TO SEEK
 1123 040204  005467  142712          3$:      NEG     TEMP2           ;CHANGE DIFF ARGUMENT FOR OPPOSITE DIR
 1124 040210  011413                  4$:      MOV     (R4),(R3)       ;MOV CURRENT INTO NEW
 1125 040212  026714  142064                   CMP     HLMTW,(R4)      ;CHECK IF CURRENT AT 255
 1126 040216  001004                           BNE     7$              ;NO - SKIP
 1127 040220  012767  177777  142674           MOV     #-1,TEMP2       ;AT MAX CYL, MAKE NEXT SEEK REV
 1128 040226  000405                           BR      8$              ;SKIP
 1129 040230  005714                  7$:      TST     (R4)            ;TEST IF CURRENT AT 0
 1130 040232  001003                           BNE     8$              ;NO - SKIP
 1131 040234  012767  000001  142660           MOV     #1,TEMP2        ;AT CYL 0, MAKE NEXT SEEK FWRD
 1132 040242  066713  142654          8$:      ADD     TEMP2,(R3)      ;ADD DIFF TO NEW CYL (+1 OR -1)
 1133 040246  004767  160110          9$:      JSR     PC,XSEEK        ;DO SEEK
 1134 040252  040330                           60$
 1135 040254  012701  000226                   MOV     #150.,R1        ;SET WAIT COUNT FOR 15 MS
 1136 040260  004767  162364                   JSR     PC,RDYWAIT      ;WAIT FOR READY
 1137 040264  040330                           60$
 1138 040266  004767  162730                   JSR     PC,GETPOS       ;STORE POSITION
 1139 040272  040330                           60$
 1140 040274  011501                           MOV     (R5),R1         ;GET OLD POSITION
 1141 040276  161401                           SUB     (R4),R1         ;SUBTRACT FROM NEW POINTER (FORWARD)
 1142 040300  005767  142604                   TST     DESSGN          ;CHECK IF SIGN FORWARD
 1143 040304  001402                           BEQ     10$             ;YES-SKIP, ELSE SUB FOR SEEK REVERSE
 1144 040306  011401                           MOV     (R4),R1         ;GET NEW CYLINDER
 1145 040310  161501                           SUB     (R5),R1         ;SUBTRACT FROM OLD CYL
 1146 040312  022701  000001          10$:     CMP     #1,R1           ;CHECK IF RESULT IS DIFFERENCE OF 1
 1147 040316  001404                           BEQ     12$             ;YES-SKIP
 1148 040320                                   ERRHRD  201.,,ERR8      ;ELSE REPORT ERROR
      040320  104456                           TRAP    C$ERHRD
      040322  000311                           .WORD   201
      040324  000000                           .WORD   0
      040326  013736                           .WORD   ERR8
 1149 040330                          12$:
 1150 040330  012767  000002  142460  60$:     MOV     #2,ERRSWI       ;INIT ERROR SWITCH
 1151 040336                          ENDSUB
      040336                          L10056:
      040336  104403                           TRAP    C$ESUB
 1152 040340                                   ESCAPE  TST             ;EXIT TEST IF ERROR
      040340  104410                           TRAP    C$ESCAPE
      040342  000030                           .WORD   L10055-.
 1153 040344  005367  142546                   DEC     TEMPO           ;DEC PASS COUNT
 1154 040350  001410                                BEQ     30$               ;EXIT IF DONE
 1155
 1156 040352  032767  000001  142536                BIT     #BITO,TEMPO       ;TEST IF PASS 1 OR 3
 1157 040360  001003                                BNE     20$               ;YES-SKIP
 1158 040362  004767  161456                        JSR     PC,SWAPHD         ;GO SWAP TO HEAD 1 OR END TEST
 1159 040366  040372                                30$                       ;ABORT RETURN
 1160 040370  000671                        20$:    BR      T187$             ;LOOP
 1161 040372                                30$:
 1162 040372                                T1865$:
 1163 040372                                ENDTST
      040372                                L10055:
      040372  104401                                TRAP    C$ETST
 1164 040374                                ENDMOD
 1165
 1166                                       .SBTTL  PARAMETER CODING
 1167 040374                                BGNMOD  HRDPRM
 1168 040374                                BGNHRD
      040374  000030                                .WORD L10057-L$HARD/2
 1169
 1170 040376                                GPRML   CNTYPE,CNT,1,YES
      040376  005130                                .WORD   T$CODE
      040400  040542                                .WORD   CNTYPE
      040402  000001                                .WORD   1
 1171
 1172 040404                                GPRMA   CSRMSG,CSR,0,160000,177776,YES
      040404  000031                                .WORD   T$CODE
      040406  040456                                .WORD   CSRMSG
      040410  160000                                .WORD   T$LOLIM
      040412  177776                                .WORD   T$HILIM
 1173
 1174 040414                                GPRMA   VECMSG,VECT,0,0,776,YES
      040414  001031                                .WORD   T$CODE
      040416  040472                                .WORD   VECMSG
      040420  000000                                .WORD   T$LOLIM
      040422  000776                                .WORD   T$HILIM
 1175
 1176 040424                                GPRMD   DRMSG,DRSB,0,3400,0,7,YES
      040424  004032                                .WORD   T$CODE
      040426  040534                                .WORD   DRMSG
      040430  003400                                .WORD   3400
      040432  000000                                .WORD   T$LOLIM
      040434  000007                                .WORD   T$HILIM
 1177
 1178 040436                                GPRML   DRTYPE,TYPDR,1,YES
      040436  003130                                .WORD   T$CODE
      040440  040512                                .WORD   DRTYPE
      040442  000001                                .WORD   1
 1179
 1180 040444                                GPRMD   BRMSG,PRIOR,0,340,0,7,YES
      040444  002032                                .WORD   T$CODE
      040446  040501                                .WORD   BRMSG
      040450  000340                                .WORD   340
      040452  000000                                .WORD   T$LOLIM
      040454  000007                                .WORD   T$HILIM
 1181
 1182 040456                                ENDHRD
                                                    .EVEN
```

```
     040456                                   L10057:
1183
1184                                          .EVEN
1185
1186 040456      102       125       123      CSRMSG: .ASCIZ  /BUS ADDRESS/
     040461      040       101       104
     040464      104       122       105
     040467      123       123       000
1187
1188 040472      126       105       103      VECMSG: .ASCIZ  /VECTOR/
     040475      124       117       122
     040500      000
1189
1190 040501      102       122       040      BRMSG:  .ASCIZ  /BR LEVEL/
     040504      114       105       126
     040507      105       114       000
1191
1192 040512      104       122       111      DRTYPE: .ASCIZ  /DRIVE TYPE = RL01/
     040515      126       105       040
     040520      124       131       120
     040523      105       040       075
     040526      040       122       114
     040531      060       061       000
1193
1194 040534      104       122       111      DRMSG:  .ASCIZ  /DRIVE/
     040537      126       105       000
1195
1196 040542      122       114       061      CNTYPE: .ASCIZ  /RL11/
     040545      061       000
1197
1198 040547                                   ENDMOD
1199
1200                                          .EVEN
1201
1202 040550                                   BGNMOD  SFTPRM
1203 040550                                   BGNSFT
     040550  000016                                   .WORD L10060-L$SOFT/2
1204
1205 040552                                   GPRML   SELQ,MISWI,4,YES
     040552  000130                                   .WORD   T$CODE
     040554  040606                                   .WORD   SELQ
     040556  000004                                   .WORD   4
1206
1207 040560                                   GPRML   ALGNQ,MISWI,10,YES
     040560  000130                                   .WORD   T$CODE
     040562  040641                                   .WORD   ALGNQ
     040564  000010                                   .WORD   10
1208
1209 040566                                   GPRML   MANQ,MISWI,100000,YES
     040566  000130                                   .WORD   T$CODE
     040570  040700                                   .WORD   MANQ
     040572  100000                                   .WORD   100000
1210
1211 040574                                   3$:     GPRMD   ERLIMQ,ERLIM,D,377,0,377,YES
     040574  004052                                   .WORD   T$CODE
     040576  040735                                   .WORD   ERLIMQ
     040600  000377                                   .WORD   377
```

```
      040602  000000                                 .WORD   T$LOLIM
      040604  000377                                 .WORD   T$HILIM
1212
1213  040606                               ENDSFT
                                                     .EVEN
      040606                               L10060:
1214
1215                                       .EVEN
1216
1217  040606     105       130       105   SELQ:     .ASCIZ  /EXECUTE DRIVE SELECT TESTS/
      040611     103       125       124
      040614     105       040       104
      040617     122       111       126
      040622     105       040       123
      040625     105       114       105
      040630     103       124       040
      040633     124       105       123
      040636     124       123       000
1218
1219  040641     105       130       105   ALGNQ:    .ASCIZ  /EXECUTE HEAD ALIGNMENT SUPPORT/
      040644     103       125       124
      040647     105       040       110
      040652     105       101       104
      040655     040       101       114
      040660     111       107       116
      040663     115       105       116
      040666     124       040       123
      040671     125       120       120
      040674     117       122       124
      040677     000
1220
1221  040700     104       117       040   MANQ:     .ASCIZ  /DO MANUAL INTERVENTION TESTS/
      040703     115       101       116
      040706     125       101       114
      040711     040       111       116
      040714     124       105       122
      040717     126       105       116
      040722     124       111       117
      040725     116       040       124
      040730     105       123       124
      040733     123       000
1222
1223  040735     111       116       120   ERLIMQ: .ASCIZ  /INPUT ERROR LIMIT/
      040740     125       124       040
      040743     105       122       122
      040746     117       122       040
      040751     114       111       115
      040754     111       124       000
1224
1225                                       .EVEN
1226
1227  040760                               ENDMOD
1228
1229  040760                               LASTAD
                                                     .EVEN
      040760  000000                                 .WORD   0
      040762  000000                                 .WORD   0
```

```
       040764                            L$LAST::
  1230                                   .EVEN
  1231
  1232 040764                            L$LAST::
  1233
  1234           000001                  .END
```

SYMBOL TABLE

```
ADR   = 000020 G    CNT   = 000012      C$PNTX= 000015      ERR1    012464 G    F$HW  = 000013
ALGNQ   040641      CNTYPE  040542      C$QIO = 000377      ERR10   014076 G    F$INIT= 000006
ALLCYL= 000001      COMPOP= 007777      C$RDBU= 000007      ERR2    012532 G    F$JMP = 000050
ALLSEC= 000002      CONHNG= 000004      C$REFG= 000047      ERR3    012600 G    F$MOD = 000000
ANYERR= 100000      CONTIN  015002      C$RESE= 000033      ERR4    012646 G    F$MSG = 000011
ASSEMB= 000010      COSTAT= 000040      C$REVI= 000003      ERR5    012716 G    F$PROT= 000021
BADADD= 004000      COUNT   003154      C$RFLA= 000021      ERR6    012766 G    F$PWR = 000017
BAMSK = 000060      CRDYMS= 000200      C$RPT = 000025      ERR7    013666 G    F$RPT = 000012
BANAM   006125      CSNAM   006120      C$SEFG= 000046      ERR8    013736 G    F$SEG = 000003
BASADD  006042      CSR   = 000000      C$SPRI= 000041      ERR9    014032 G    F$SOFT= 000005
BELL    011274      CSRMSG  040456      C$SVEC= 000037      EVL   = 000004 G    F$SRV = 000010
BHSTAT= 000010      CURCYL  003104      C$TPRI= 000013      EXT05   032134      F$SUB = 000002
BIT0  = 000001 G    CYLPER  007070      C10MS   011373      E$END = 002100      F$SW  = 000014
BIT00 = 000001 G    CYLTBL  002604      C5SEC   011434      E$LOAD= 000035      F$TEST= 000001
BIT01 = 000002 G    CYLUP = 000004      C500MS  011404      FBSFIL  003570      GBND    002310
BIT02 = 000004 G    CYLWD   010225      DANAM   006132      FMTOP1  011442      GDRSTA  020202
BIT03 = 000010 G    C$AU  = 000052      DATACM= 000001      FMTOP2  011471      GETPOS  023222
BIT04 = 000020 G    C$AUTO= 000061      DCKERR= 004000      FMTOP3  011513      GETSTA= 000003
BIT05 = 000040 G    C$BRK = 000022      DCLIM = 000012      FMT1    011534      GLBDAT  002224 G
BIT06 = 000100 G    C$BSEG= 000004      DCLIMW  014340      FMT1.1  011541      GLBEQA  002224 G
BIT07 = 000200 G    C$BSUB= 000002      DESDIF  003106      FMT11   011760      GLBERR  012464 G
BIT08 = 000400 G    C$CEFG= 000045      DESHD   003112      FMT12   011766      GLBSUB  016444 G
BIT09 = 001000 G    C$CLCK= 000062      DESSEC  003114      FMT13   011774      GLBTXT  005242 G
BIT1  = 000002 G    C$CLEA= 000012      DESSGN  003110      FMT14   012040      GSTAT   017076
BIT10 = 002000 G    C$CLOS= 000035      DIAGMC= 000000      FMT15   012072      GSTATC  017062
BIT11 = 004000 G    C$CLP1= 000006      DIFAUG  003076      FMT16   012126      GSTATG  017106
BIT12 = 010000 G    C$CVEC= 000036      DIFWD   010201      FMT17   012137      GSTATR  017046
BIT13 = 020000 G    C$DCLN= 000044      DIRBIT= 000004      FMT18   012161      GSTER1  006464
BIT14 = 040000 G    C$DODU= 000051      DIRMSK  002314      FMT19   012213      GTSTAT= 000104
BIT15 = 100000 G    C$DRPT= 000024      DLTERR= 010000      FMT2    011550      G$CNTO= 000200
BIT2  = 000004 G    C$DU  = 000053      DLYCNT  003142      FMT20   012250      G$DELM= 000372
BIT3  = 000010 G    C$EDIT= 000003      DONE    003006      FMT21   012300      G$DISP= 000003
BIT4  = 000020 G    C$ERDF= 000055      DRDYMS= 000001      FMT22   012323      G$EXCP= 000400
BIT5  = 000040 G    C$ERHR= 000056      DRMSG   040534      FMT23   012357      G$HILI= 000002
BIT6  = 000100 G    C$ERRO= 000060      DRSB  = 000010      FMT24   012373      G$LOLI= 000001
BIT7  = 000200 G    C$ERSF= 000054      DRSELT= 000004      FMT25   012400      G$NO  = 000000
BIT8  = 000400 G    C$ERSO= 000057      DRSET = 000010      FMT26   012410      G$OFFS= 000400
BIT9  = 001000 G    C$ESCA= 000010      DRTYPE  040512      FMT27   012434      G$OFSI= 000376
BOE   = 000400 G    C$ESEG= 000005      DRVCNT  003074      FMT28   012453      G$PRMA= 000001
BRMSG   040501      C$ESUB= 000003      DRVERR= 040000      FMT3    011553      G$PRMD= 000002
BSFLAG  003020      C$ETST= 000001      DRVNAM  006053      FMT4    011556      G$PRML= 000000
BSFVAL  003372      C$EXIT= 000032      DSESTA= 000400      FMT5    011567      G$RADA= 000140
BSNSTR  010307      C$GETB= 000026      DSMSK = 001400      FMT6    011607      G$RADB= 000000
BYPSNM  010240      C$GETW= 000027      DSPCOD  014342 G    FMT7    011651      G$RADD= 000040
CAFDT   011423      C$GMAN= 000043      EF.CON= 000036 G    FMT8    011721      G$RADL= 000120
CAMSK   002312      C$GPHR= 000042      EF.NEW= 000035 G    FMT9    011753      G$RADO= 000020
CCYLUP  011412      C$GPLO= 000030      EF.PWR= 000034 G    FOLWRT= 000100      G$XFER= 000004
CDRDY   011353      C$GPRI= 000040      EF.RES= 000037 G    FRMWD   010232      G$YES = 000010
CHOSHD  022020      C$INIT= 000011      EF.STA= 000040 G    FWDSKO= 002000      HADONE  003010
CKDATA= 000102      C$INLP= 000020      ERHEAD  003012      FWDSKS= 000400      HAMES1  007154
CKERLM  016444      C$MANI= 000050      ERLIM = 000010      F$AU  = 000015      HAMES2  007237
CLKADR  003146      C$MEM = 000031      ERLIMQ  040735      F$AUTO= 000020      HAMES3  007343
CLKFLG  003144      C$MSG = 000023      ERLIMW  014336      F$BGN = 000040      HAMES4  007406
CLKINT  016430 G    C$OPEN= 000034      ERRCNT  003160      F$CLEA= 000007      HCESTA= 040000
CLNCOD  016174 G    C$PNTB= 000014      ERRPOI  003156      F$DU  = 000016      HCRCER= 004000
CLRBYT  002304      C$PNTF= 000017      ERRSWI  003016      F$END = 000041      HDALIG= 000010
CLRPAR  025146      C$PNTS= 000016      ERRVEC  003140      F$HARD= 000004      HDCYL   002316
```

```
HDHSEL= 000100      LAB1    006144      L$SPCP  002020 G    L10057  040456      MRSLT   005423
HDMOVF  007031      LAB2    006157      L$SPTP  002024 G    L10060  040606      MSEEK   005242
HDRCMP= 000002      LBASE   003150      L$STA   002030 G    MANQ    040700      MSPERR  010662
HDR40 = 100000      LCLEXT  033406      L$SW    014326 G    MBADAD  005721      MSTERR  010715
HDSEC = 000077      LCLK    014514      L$TEST  002114 G    MBADSF  005742      MTMBS   006020
HDSEL = 000020      LCLK1   014522      L$TIML  002014 G    MBHSTA  010575      MTOSLO  006200
HDWD    010214      LOCERR  003364      L$UNIT  002012 G    MBSETO= 000001      MULOAD  005434
HDWRD1  003052      LOCYL = 040000      L.BA    003036      MCERR   010415      MUNDEF  011103
HDWRD2  003054      LOE   = 040000 G    L.CS    003034      MCONHN  006273      MVOLCK  010551
HDWRD3  003056      LOLIM = 000002      L.DA    003040      MCOSTA  010562      MWDERR  010751
HEAD  = 000006      LOLIMW  014330      L.MP    003042      MCYLOC  011052      MWGERR  010700
HEADLM= 010000      LOT   = 000010 G    L10000  012530      MCYLUP  005445      MWLSTA  010610
HEADW   014334      LPT05   031714      L10001  012576      MDATCP  005327      MWORD   006172
HICYL = 020000      L$ACP   002110 G    L10002  012644      MDCRC   010437      MWRCHK  005271
HILIM = 000004      L$APT   002036 G    L10003  012714      MDHEDR  002000 G    MWRITE  005303
HILIMW  014332      L$AUT   002070 G    L10004  012764      MDLT    010464      MWRSET  005400
HLMTW   002302      L$AUTO  015636 G    L10005  013664      MDRDY   010404      MWRTAB  011211
HNFERR= 010000      L$CCP   002106 G    L10006  013734      MDRERR  010526      M40HDR  005364
HOE   = 100000 G    L$CLEA  016174 G    L10007  014030      MDRRES  006220      NEWCYL  003102
HOSTAT= 000020      L$CO    002032 G    L10010  014074      MDRVST  010647      NOCLR = 000010
HPTCOD  014306 G    L$DEPO  002011 G    L10011  014304      MDSERR  010632      NOCTLR  006754
HRDPRM  040374 G    L$DESC  002122 G    L10012  014324      MERRS   011265      NOERCT  003365
HRDWTS  025176 G    L$DESP  002076 G    L10013  014342      MEXERS  011225      NOIRPT= 000002
HSMSK = 000100      L$DEVP  002060 G    L10015  015634      MFLERR  011013      NOOP  = 000100
HSSTAT= 000100      L$DISP  014344 G    L10016  016172      MFMTER  005773      NOPCLK  014442
IBE   = 010000 G    L$DLY   002116 G    L10017  016362      MFOLWR  005521      NOPWR   006060
IBUFF   003764      L$DTP   002040 G    L10020  016366      MFWDSK  005576      NOTRDY  007003
IDU   = 000040 G    L$DTYP  002034 G    L10021  016426      MFWSKO  005631      NOTST   006664
IER   = 020000 G    L$DU    016364 G    L10022  016434      MGTSTA  005315      NSTACH  006416
INITCO  014412 G    L$DUT   002072 G    L10023  016442      MHCERR  010733      NXMERR= 020000
INITST  006515      L$DVTY  002212 G    L10024  025454      MHCRC   010427      NXTHL   002306
INOUTS= 000020      L$EF    002052 G    L10025  025662      MHDERR  010776      NXTPAS  015022
INTEBL= 000100      L$ENVI  002044 G    L10026  030342      MHDRCP  005346      OBUFF   004364
INTHLR  016370 G    L$ETP   002102 G    L10027  031530      MHFCRC  010476      OLDCYL  003100
ISR   = 000100 G    L$EXP1  002046 G    L10030  031426      MHNF    010450      ONSWAP  022104
IXE   = 004000 G    L$EXP4  002064 G    L10031  032134      MHOSTA  010621      OPFLAG  003004
I$AU  = 000041      L$EXP5  002066 G    L10032  032042      MHSTA   010537      OPIERR= 002000
I$AUTO= 000041      L$HARD  040376 G    L10033  033406      MINOUT  005476      OPMSGS  002224
I$CLN = 000041      L$HIME  002120 G    L10034  033332      MISTST  006373      OPR002  007470
I$DU  = 000041      L$HPCP  002016 G    L10035  034300      MISWI = 000000      OPR003  007515
I$HRD = 000041      L$HPTP  002022 G    L10036  034366      MISWIW  014326      OPR004  010164
I$INIT= 000041      L$HW    014310 G    L10037  035022      MITEST= 100000      OPR1    007540
I$MOD = 000041      L$ICP   002104 G    L10040  035500      MNDRST  011057      OPR1A   010135
I$MSG = 000041      L$INIT  014412 G    L10041  035460      MNEERR  011041      OPR1B   010141
I$PROT= 000040      L$LADP  002026 G    L10042  036256      MNOCLR  006307      OPR10   010003
I$PTAB= 000041      L$LAST  040764 G    L10043  036154      MNOINT  006240      OPR11   010051
I$PWR = 000041      L$LOAD  002100 G    L10044  036254      MOPER   005414      OPR12   010102
I$RPT = 000041      L$LUN   002074 G    L10045  036730      MOPERR  010766      OPR12A  010121
I$SEG = 000041      L$MREV  002050 G    L10046  036710      MORECE  003014      OPR2    007616
I$SETU= 000041      L$NAME  002000 G    L10047  037150      MOUTIN  005455      OPR3    007651
I$SFT = 000041      L$PRIO  002042 G    L10050  037062      MPNAM   006137      OPR6    007665
I$SRV = 000041      L$PROT  014404 G    L10051  037430      MQUALS= 003760      OPR7    007720
I$SUB = 000041      L$PRT   002112 G    L10052  037406      MREAD   005250      OPR8    007747
I$TST = 000041      L$REPP  002062 G    L10053  040076      MREADH  005261      OPR9    007766
JJJ     002300      L$REV   002010 G    L10054  040040      MRESKO  005665      OUTINS= 000040
J$JMP = 000167      L$SOFT  040552 G    L10055  040372      MREVSK  005543      O$APTS= 000000
LAB     014754      L$SPC   002056 G    L10056  040336      MRLFAL  011150      O$AU  = 000000
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```
O$BGNR= 000000      RELDWT= 040000      SVCTAG= 000000      T$TSTM= 177777      T16.1   040154
O$BGNS= 000001      RESE3   011300      SVCTST= 000001      T$TSTS= 000001      T172$   037522
O$DU  = 000001      RESE4   011304      SWAPHD  022044      T$$AUT= 010016      T1765$  040076
O$ERRT= 000000      RESE5   011311      S$LSYM= 010000      T$$CLE= 010017      T1865$  040372
O$GNSW= 000001      RESE6   011316      TBLSTR  003024      T$$DU = 010020      T187$   040154
O$POIN= 000001      RESPAR  003062      TBT     002544      T$$HAR= 010057      T2      025456 G
O$SETU= 000000      RESTAR  014772      TCERR   010363      T$$HW = 010012      T25TBL  002430
PART1 = 000001 G    RESTBL  002320      TCLK    014564      T$$INI= 010015      T25TB2  002456
PASCNT  003152      REVSKO= 001000      TEMP0   003116      T$$MSG= 010011      T3      025664 G
PASNEW  015030      REVSKS= 000200      TEMP1   003120      T$$PRO= 010014      T33TBL  002504
PASNUM  003360      RLBA  = 000002      TEMP2   003122      T$$SOF= 010060      T365$   030342
PATTBL  002360      RLBAS   003026      TEMP3   003124      T$$SRV= 010023      T4      030344 G
PAT1    004764      RLCS  = 000000      TEMP4   003126      T$$SUB= 010056      T4.1    030364
PAT10   005240      RLCSR = 000000      TEMP5   003130      T$$SW = 010013      T465$   031420
PAT2    004766      RLDA  = 000004      TEMP6   003132      T$$TES= 010055      T5      031532 G
PAT3    005026      RLDRV   003032      TEMP7   003134      T.BA    003046      T5.1    032024
PAT4    005066      RLMP  = 000006      TEMP8   003136      T.CS    003044      T504$   032056
PAT5    005126      RLVEC   003030      TOSLOW= 000001      T.DA    003050      T6      032136 G
PAT6    005134      RORWOP= 020000      TRPFLG  003366      T.DRIV  002276      T6.1    032650
PAT7    005174      RPTOP   023716      TRPHAN  016436 G    T.MP    003052      T7      033410 G
PAT8    005176      RPTREM  024712      TSTCLK  014556      T.STAT  003060      T8      034302 G
PAT9    005236      RPTRES  024504      TSTINT  017030      T05ERR  006530      T9      034370 G
PCLK    014412      RSTRT   014710      TSTLAB  006365      T09ERR  006543      UAM   = 000200 G
PNT   = 001000 G    SAMSK = 000077      TST4    030366      T1      025176 G    ULOAD = 000010
POSHDO  022624      SBSFIL  003374      TYPDR = 000006      T10     035024 G    UNDTST  010151
POSHSB  022620      SECWD   010220      T$ARGC= 000002      T10ERR  006553      UNXERR  006350
POSHW1  022612      SEEK  = 000106      T$CODE= 004052      T10.1   035056      VCNRST  006327
PRI   = 002000 G    SEEKOP= 010000      T$ERRN= 000311      T104$   035056      VCSTAT= 001000
PRIOR = 000004      SELQ    040606      T$EXCP= 000000      T11     035502 G    VECMSG  040472
PRI00 = 000000 G    SEQMES  010253      T$FLAG= 000040      T11.1   036002      VECT  = 000002
PRI01 = 000040 G    SETDON  015056      T$GMAN= 000000      T11.2   036156      WAITIN  016636
PRI02 = 000100 G    SFTPRM  040550 G    T$HILI= 000377      T115$   036156      WCMSK = 017777
PRI03 = 000140 G    SGNWD   010207      T$LAST= 000001      T12     036260 G    WCRNG = 160000
PRI04 = 000200 G    SIMSEK  021152      T$LOLI= 000000      T12ERR  006573      WDESTA= 100000
PRI05 = 000240 G    SPDERR  006430      T$LSYM= 010000      T12.1   036306      WGESTA= 002000
PRI06 = 000300 G    SPDSTA= 004000      T$LTNO= 000020      T124$   036306      WLSTAT= 020000
PRI07 = 000340 G    SPTCOD  014324 G    T$NEST= 177777      T13     036732 G    WRTSWI  003022
PSETNM  003362      SSINDX  003002      T$NS0 = 000000      T13ERR  006605      WTDATA= 000112
PWCON   015300      STAMES  010276      T$NS1 = 000005      T13.1   036756      XRDHD   022140
PWRFLG  003370      STAMSK= 000007      T$NS2 = 000002      T134$   036756      XRDHDC  022130
P2T01E  006645      STATE2  011323      T$PTNU= 000000      T14     037152 G    XRDHDG  022144
P2T02E  006645      STATE3  011333      T$SAVL= 177777      T14ERR  006621      XSEEK   020362
RDALHD  023350      STATE5  011343      T$SEGL= 177777      T14.1   037174      XSEEKT  020352
RDDATA= 000114      STOSTA= 010000      T$SUBN= 000001      T15     037432 G    XSEEK1  020366
RDHEAD= 000110      SUBSTK  002404      T$TAGL= 177777      T15.1   037522      X$ALWA= 000000
RDNOHR= 000116      SVCBGL= 000001      T$TAGN= 010061      T153$   037174      X$FALS= 000040
RDYCHK  021462      SVCGBL= 000000      T$TEMP= 000000      T16     040100 G    X$OFFS= 000400
RDYWAI  022650      SVCINS= 000000      T$TEST= 000020      T16ERR  006635      X$TRUE= 000020
READRL  016604      SVCSUB= 000001

. ABS.  040764     000
        000000     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  30464 WORDS  ( 119 PAGES)
DYNAMIC MEMORY AVAILABLE FOR  71 PAGES
,CZRLID/C=SVC33.SRC/P:1,CZRLID.P11
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ADR       2-5#
ALGNQ     9-<07     9-<19#
ALLCYL    2-24#
ALLSEC    2-25#
ANYERR    2-77#     8-162     8-507     8-785     9-429
ASSEMB    1-8       1-8
BADADD    2-56#
BAMSK     2-88#
BANAM     6-391#    8-<50
BASADD    6-387#    7-421     7-655     7-690     7-701     8-15      8-<48     9-17      9-60      9-98      9-102     9-276     9-284     9-336
          9-355     9-516     9-527     9-761     9-772
BELL      7-80#
BHSTAT    3-24#     9-30      9-160     9-167     9-178     9-544
BIT0      2-5#      9-682     9-:88     9-;56
BIT00     2-5       2-5#      2-24      2-46      2-65      8-;95
BIT01     2-5       2-5#      2-25      2-45      2-66
BIT02     2-5       2-5#      2-26      2-47      2-67
BIT03     2-5       2-5#      2-27      2-48      2-68
BIT04     2-5       2-5#      2-49
BIT05     2-5       2-5#      2-50
BIT06     2-5       2-5#      2-51
BIT07     2-5       2-5#      2-52
BIT08     2-5       2-5#      2-53
BIT09     2-5       2-5#      2-54
BIT1      2-5#
BIT10     2-5#      2-55      8-135     8-213     8-294     8-357     8-598     8-884
BIT11     2-5#      2-56
BIT12     2-5#      2-28      2-57
BIT13     2-5#      2-29      2-58
BIT14     2-5#      2-30      2-59
BIT15     2-5#      2-31      2-60      7-320
BIT2      2-5#
BIT3      2-5#
BIT4      2-5#
BIT5      2-5#
BIT6      2-5#
BIT7      2-5#
BIT8      2-5#
BIT9      2-5#      7-284
BOE       2-5#
BRMSG     9-;80     9-;90#
BSFLAG    6-152#
BSFVAL    6-249#
BSNSTR    7-42#
BYPSNM    7-39#
C$AU      1-8#
C$AUTO    1-8#      7-705
C$BRK     1-8#      7-651     7-721     8-99      8-116     8-151     8-504     8-761     8-774     8-779     9-521     9-535     9-639     9-705
          9-799     9-854     9-:36     9-:63     9-:74     9-;15
C$BSEG    1-8#
C$BSUB    1-8#      9-268     9-379     9-455     9-686     9-774     9-807     9-836     9-909     9-957     9-:33     9-;12
C$CEFG    1-8#
C$CLCK    1-8#      7-486
C$CLEA    1-8#      7-727
C$CLOS    1-8#
C$CLP1    1-8#
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C$DCLN    1-8#      7-659     8-18
C$DODU    1-8#      7-658     7-692     7-703     8-17
C$DRPT    1-8#
C$DU      1-8#      7-731
C$EDIT    1-8#      1-17
C$ERDF    1-8#
C$ERHR    1-8#      8-120     8-157     8-170     8-176     8-321     8-326     8-384     8-498     8-509     8-612     8-623     8-627     8-635
          8-771     8-783     8-787     8-905     8-910     9-29      9-33      9-37      9-41      9-72      9-77      9-124     9-138     9-143
          9-162     9-173     9-184     9-192     9-201     9-214     9-226     9-231     9-236     9-250     9-306     9-318     9-330     9-474
          9-481     9-547     9-557     9-570     9-579     9-606     9-634     9-644     9-653     9-658     9-666     9-668     9-698     9-710
          9-720     9-724     9-733     9-735     9-848     9-859     9-870     9-875     9-883     9-885     9-925     9-927     9-942     9-985
          9-991     9-:71     9-:78     9-;48
C$ERRO    1-8#
C$ERSF    1-8#
C$ERSO    1-8#
C$ESCA    1-8#      9-:84     9-;52
C$ESEG    1-8#
C$ESUB    1-8#      9-334     9-384     9-488     9-739     9-805     9-820     9-889     9-931     9-:05     9-:83     9-;51
C$ETST    1-8#      9-45      9-79      9-99      9-254     9-344     9-395     9-495     9-587     9-609     9-671     9-745     9-822     9-895
          9-944     9-:11     9-:95     9-;63
C$EXIT    1-8#      9-91      9-125     9-144     9-163     9-174     9-185     9-193     9-202     9-215     9-227     9-232     9-237     9-266
          9-307     9-319     9-405     9-475     9-482     9-505     9-548     9-558     9-580     9-635     9-645     9-654     9-659     9-667
          9-699     9-711     9-721     9-725     9-734     9-758     9-849     9-860     9-871     9-876     9-884     9-926
C$GETB    1-8#
C$GETW    1-8#
C$GMAN    1-8#      9-20      9-62      9-118     9-278     9-303     9-339     9-358     9-376     9-391     9-451     9-491     9-529     9-815
C$GPHR    1-8#      7-589     9-415
C$GPLO    1-8#
C$GPRI    1-8#
C$INIT    1-8#      7-665
C$INLP    1-8#      8-12      9-:38     9-;17
C$MANI    1-8#      7-539     7-631
C$MEM     1-8#
C$MSG     1-8#      7-201     7-215     7-229     7-244     7-259     7-364     7-378     7-400     7-414     7-428
C$OPEN    1-8#
C$PNTB    1-8#      7-302     7-335     7-349     7-358     7-421     7-422     7-424     8-;66     8-;67     8-;71     8-;84     8-<00     8-<04
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C$RFLA    1-8#
C$RPT     1-8#
C$SEFG    1-8#
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C$TPRI    1-8#
C10MS     7-95#
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CAMSK    5-34#     7-607*    7-615*
CCYLUP   7-97#     9-556     9-605
CDRDY    7-93#     9-629     9-693     9-843
CHOSHD   8-526#    9-:31     9-;06
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CLKFLG   6-232#    7-483*    7-489*    7-495*    7-527     9-114     9-136     9-147     9-171     9-182     9-212     9-224     9-245     9-300
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CNTYPE   9-;70     9-;96#
COMPOP   2-44#     8-;91
CONHNG   2-67#
CONTIN   7-571#
COSTAT   3-26#     9-26      9-69
COUNT    6-238#
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DIFWD    7-33#     8-<08
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DRTYPE    9-;78     9-;92#
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DSPCOD    7-461#
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ERR2      7-203#    9-72      9-77      9-570     9-668     9-735     9-885     9-927
ERR3      7-217#    8-771     9-29      9-33      9-37      9-143     9-481     9-547     9-666     9-733     9-883     9-925
ERR4      7-231#    9-173     9-557     9-606     9-634     9-698     9-848
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ERR8      7-380#    9-;48
ERR9      7-402#
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HDWRD3   6-170#
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HEADW    7-455#   8-529
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MEXERS   7-78#    8-14
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RDHEAD  2-37#   8-599
RDNOHR  2-40#
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RLCSR     2-76#     8-24      8-35      8-138*    8-218*    8-604*    9-457*    9-467*    9-783*    9-798*
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SPTCOD    7-443#
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STATE5    7-91#     9-248
STOSTA    3-32#
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          9-876    9-883    9-884    9-885    9-889    9-895    9-909    9-925    9-926    9-927    9-931    9-942    9-944    9-957
          9-985    9-991    9-:05    9-:11    9-:33    9-:36    9-:38    9-:63    9-:71    9-:74    9-:78    9-:83    9-:84    9-:95
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          9-511    9-563    9-581    9-632    9-647    9-656    9-696    9-713    9-722    9-846    9-863    9-873
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          9-220    9-291    9-293    9-312    9-324    9-522    9-536    9-642    9-708    9-857    9-:69    9-:76
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T09ERR    6-412#   9-615
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T11.2     9-807#
T115$     9-757    9-806#
T12       7-463    9-827#
T12.1     9-836#
T124$     9-835#   9-893
T12ERR    6-414#   9-828
T13       7-463    9-900#
T13.1     9-909#
T134$     9-908#   9-936
T13ERR    6-415#   9-901
T14       7-463    9-949#
T14.1     9-957#
T14ERR    6-416#   9-950
T15       7-463    9-:16#
T15.1     9-:33#
T153$     9-956#   9-:09
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T187$     9-;11#    9-;60
T2        7-463     9-51#
T25TB2    6-41#
T25TBL    6-28#
T3        7-463     9-84#
T33TBL    6-55#
T365$     9-94      9-109     9-129     9-152     9-166     9-177     9-189     9-198     9-207     9-219     9-240     9-253#
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T4.1      9-268#
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T5.1      9-379#
T504$     9-364     9-388#
T6        7-463     9-400#
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T7        7-463     9-500#
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T9        7-463     9-614#
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TBT       6-56#
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TEMP5     6-194#
TEMP6     6-195#
TEMP7     6-196#
TEMP8     6-197#
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TRPFLG    6-245#    7-680*    7-686     7-759*
TRPHAN    7-681     7-713     7-758#
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          9-910     9-958     9-:20     9-;03
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TYPDR     2-11#     9-;78     9-;78     9-;78
UAM       2-5#
ULOAD     2-48#     9-282     9-514
UNDTST    7-31#     9-373
UNXERR    6-403#    8-172     9-98
VCNRST    6-402#    8-166
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VECMSG    9-;74     9-;88#
VECT      2-9#      9-;74     9-;74     9-;74
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WCRNG     3-16#
WDESTA    3-35#     8-108
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X$FALS   1-8#
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XRDHDC   8-573#   9-919
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XSEEKT   8-239#
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BGNCLN    7-711
BGNDU     7-729
BGNHRD    9-;68
BGNHW     7-433
BGNINI    7-481
BGNMOD    1-16      2-3       5-4       6-361     7-141     7-432     7-443     7-461     7-480     7-710     8-4       9-1       9-;67     9-<02
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BGNPRO    7-471
BGNSFT    9-<03
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BGNSW     7-444
BGNTST    9-7       9-51      9-84      9-259     9-349     9-400     9-500     9-592     9-614     9-676     9-750     9-827     9-900     9-949
          9-:16     9-;00
BNCOMP    7-545     7-550     7-632     9-416     9-:39     9-;18
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          9-854     9-:36     9-:63     9-:74     9-;15
CLRVEC    7-704     7-722     7-726
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          8-779     9-468     9-:74
DESCRI    1-20
DEVTYP    1-22
DISPAT    7-463
DOCLN     7-659     8-18
DODU      7-658     7-692     7-703     8-17
ENDAUT    7-705
ENDCLN    7-727
ENDDU     7-731
ENDHRD    9-;82
ENDHW     7-440
ENDINI    7-665
ENDMOD    1-18      3-37      6-353     7-132     7-429     7-441     7-459     7-468     7-667     7-733     8-<68     9-;64     9-;98     9-<27
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ENDPRO    7-475
ENDSFT    9-<13
ENDSRV    7-748     7-754     7-760
ENDSUB    9-334     9-384     9-488     9-739     9-805     9-820     9-889     9-931     9-:05     9-:83     9-;51
ENDSW     7-458
ENDTST    9-45      9-79      9-254     9-344     9-395     9-495     9-587     9-609     9-671     9-745     9-822     9-895     9-944     9-:11
          9-:95     9-;63
EQUALS    2-5
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          9-:71     9-:78     9-;48
ESCAPE    9-:84     9-;52
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GMANIL    9-20      9-62      9-118     9-278     9-303     9-339     9-358     9-376     9-391     9-451     9-491     9-529     9-815
GPHARD    7-589     9-415
GPRMA     9-;72     9-;74
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CZRLIDO RL01/02 DRIVE TEST 1 MACRO V04.00 4-AUG-82 10:30:59 PAGE M-5                                 SEQ 0165
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