RL11,RLV11

CTLR 1
CZRLGA0

AH-F110A-MC

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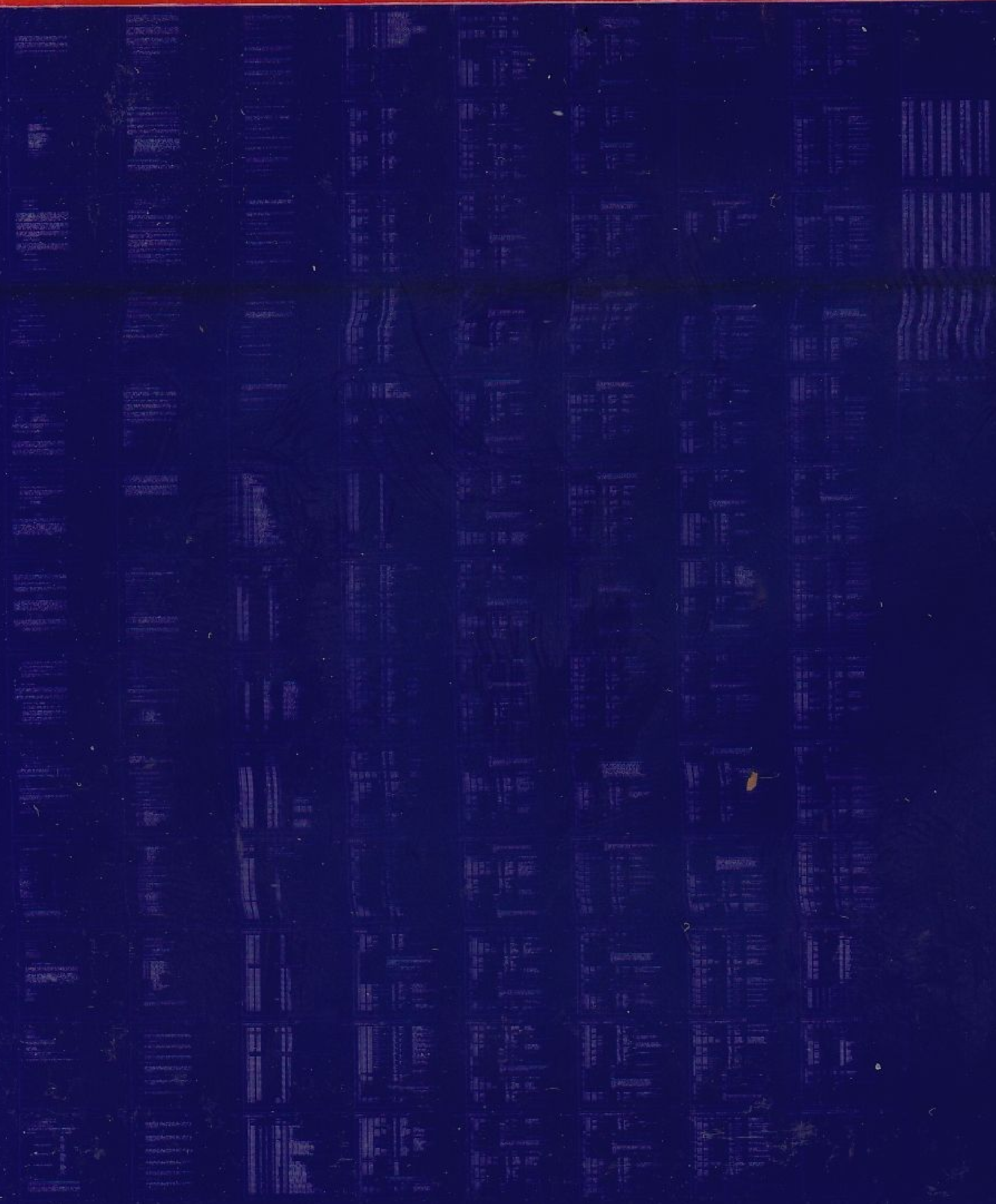

IDENTIFICATION

PRODUCT CODE:	AC-F111A-MC
PRODUCT NAME:	CZRLGAO RL11/RLV11 CONTROLLER TEST PART 1
DATE CREATED:	5-JAN-79
MAINTAINER:	DIAGNOSTIC ENGINEERING
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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

1.1.1 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC OCCUPIES 14.5K WORDS OF MEMORY AND IS COMPATIBLE WITH BOTH XXDP AND ACT. IT CAN BE RUN STANDALONE UNDER XXDP, AND CAN BE CHAINED UNDER XXDP, ACT AND APT IN ACT MODE (SEE "CREATE CORE IMAGE" COMMAND BELOW FOR DETAILS OF CHAINING PROCEDURE). IT IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, BUT WE HAVE INCORPORATED INTO IT A CONTROL MODULE WHICH WILL LATER BE RELEASED INDEPENDENTLY AS A DIAGNOSTIC SUPERVISOR.

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

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

1.1.2 DIAGNOSTIC INFORMATION

THE RL11/RLV11 CONTROLLER TEST (PART 1) IS A PDP-11 (LSI-11) BASED PROGRAM THAT WILL TEST THE CONTROLLER. IT STARTS BY TESTING BASIC INTERFACE LOGIC, REGISTER MANIPULATION AND FUNCTIONALITY WHICH INCLUDES NOOP, GET STATUS, READ HEADERS AND SEEK OPERATIONS. IT IS AIMED AT FULLY TESTING THE CONTROLLER IN THESE AREAS, BUT BY DEFAULT ALSO EXERCISES THE DRIVE. THE TEST COVERAGE OF THE PROGRAM IS EXTREMELY HIGH.

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, KW11L (OPTIONAL)

- LINE PRINTER (OPTIONAL)

1.2.2 SOFTWARE REQUIREMENTS

CZRLGA0 RL11/RLV11 CTLR 1

(FORMERLY CZRLAB)

1.3 RELATED DOCUMENTS AND STANDARDS

RL01 USERS MANUAL (EK-RL01-UG-PRE)
XXDP USERS MANUAL

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

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

CVRLAA0 RLV11 RL01 DISKLESS TEST (RLV11 ONLY)

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 SIX STEPS OF EXECUTION

THIS DIAGNOSTIC SHOULD BE LOADED AND STARTED USING NORMAL XXDP PROCEDURES. THE START COMMAND SHOULD NOT SPECIFY AN ADDRESS, BECAUSE THE DIAGNOSTIC HAS THE PROPER TRANSFER ADDRESS CODED INTO IT.

WHEN THIS DIAGNOSTIC IS STARTED, THE FOLLOWING STEPS WILL OCCUR:

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

A SHORT SERIES OF ''HARDCORE QUESTIONS'' WILL BE ASKED:

QUESTION	MEANING
L-CLK (L) N ?	IS THERE AN L-CLOCK?
P-CLK (L) N ?	'' '' '' P-CLOCK?
50HZ (L) N ?	IS THE POWER 50 CYCLES (EUROPE)?
LSI (L) N ?	IS MACHINE AN LSI?
LPT (L) N ?	IS THERE A LINE PRINTER?
MEM (K) (D) 16 ?	HOW MANY K OF MEMORY ARE THERE?

THE DEFAULTS (SHOWN AFTER EACH QUESTION) CAN BE SELECTED BY HITTING CARRIAGE RETURN. IT IS POSSIBLE THAT NOT ALL OF THE QUESTIONS WILL BE ASKED: FOR EXAMPLE, IF YOU SAY ''YES'' TO THE L-CLOCK QUESTION, THE P-CLOCK QUESTION WILL NOT BE ASKED.

IF NEITHER P OR L CLOCK ARE ANSWERED YES THE OPERATOR WILL BE ASKED TO TYPE TWO CHARACTERS 4 SECONDS APART.

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

WHEN YOU HAVE ANSWERED ALL THE HARDCORE QUESTIONS, THE DIAGNOSTIC WILL ISSUE THE PROMPT ''DS-B>''. 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 "DS-B>" 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:

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 3 *
**********
```

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 4 *
**********
```

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 5 *
**********
```

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 6 *
**********
```

AFTER YOU HAVE ANSWERED THE SOFTWARE QUESTIONS, THE DIAGNOSTIC WILL BEGIN TO EXECUTE THE HARDWARE TEST CODF. 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 DS-B>).

2. IF AN ERROP 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 OCCURED.

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 2, 3, 4, 5, AND 6 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 DIFFRENT 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 WHETHEP 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 CZRLGA                                       O

CZRLG                                           D

L-CLK (L) N ? Y                                 D,O
50HZ (L) N ?                                    D
LSI (L) N ?                                     D
LPT (L) N ?                                     D
MEM (K) (D) 16 ?                                D

DS-B>STA/PASS:1/FLAGS:HOE                       D,O

# UNITS (D) ? 2                                 D,O

UNIT 1                                          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 2                                          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


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

DS-B>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

DS-B>CON/FLAGS:HOE:IER:LOE=0                D,0

CHANGE SW (L) ? N                           D,0

CZRLG EOP 1                                 D
^C

DS-B>RESTART/PASS:1                         D,0

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

2.2 HOW TO CREATE A CHAINABLE FILE

THE DIAGNOSTIC AS RECEIVED FROM RELEASE ENGINEERING CANNOT BE RUN IN CHAIN MODE. THAT IS WHY IT BEARS THE EXTENSION "BIN" INSTEAD OF "BIC". THERE IS A WAY, HOWEVER, TO CREATE A CHAINABLE PROGRAM FROM WHAT YOU'VE GOT.

IT CONSISTS OF RUNNING THE PROGRAM WITH THE SPECIAL COMMAND "CCI" ISSUED WHERE YOU WOULD NORMALLY ISSUE A START COMMAND (TO THE PROMPT DS-B>. THIS COMMAND CAUSES THE DIAGNOSTIC TO GO THRU ALL THE QUESTIONS AND ANSWERS AND THEN TO HALT, JUST WHERE IT WOULD ORDINARILY BEGIN EXECUTION OF THE HARDWARE TEST CODE. AT THIS POINT YOU CAN DUMP THE PROGRAM AS IT SITS IN CORE TO THE LOAD MEDIUM, WITH THE NEW EXTENSION 'BIC".

HERE IS A SAMPLE DIALOGUE TO ACCOMPLISH THIS:

```
.R UPD2
RESTART:  XXXXXX
*CLR
*LOAD DIAG.BIN
XFER:200   CORE:0,60602
*START 200
L-CLK (L) N ?
-------------
-------------
-------------
```

```
DS-B>CCI
  UNITS (D) ? 4
-------------
-------------
-------------
CHANGE SW (L) ? N
PTAB END:  60632

*************************************
*AT THIS POINT THE MACHINE HALTS AND*
*YOU MUST RESTART AT ADDRESS  XXXXXX*
*************************************

*HICORE 60632
CORE:  0,60632
*DUMP DK0: DIAG.BIC
```

THE RESULT OF DOING THIS IS THAT YOU CAN NOW BUILD AN XXDP CHAIN FILE CONTAINING THE XXDP COMMAND

```
    .R DIAG.BIC
```

AND THE DIAGNOSTIC WILL EXECUTE WITHOUT MANUAL INTERVENTION, USING THE ANSWERS THAT YOU GAVE IT WHEN YOU DID THE CCI COMMAND.

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
2.	DIAGNOSTIC HAS FINISHED ALL ITS REQUESTED PASSES	START RESTART PRINT DISPLAY FLAGS ZFLAGS
3.	OPERATOR INTERRUPTED THE DIAGNOSTIC WITH CTRL/C	START RESTART CONTINUE PRINT DISPLAY FLAGS ZFLAGS
4.	AN ERROR WAS ENCOUNTERED WITH THE HOE FLAG SET SET	START RESTART CONTINUE PROCEED PRINT DISPLAY FLAGS ZFLAGS

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

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 MESSAGF 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. DEFALT 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 EFFECT 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

```
************** ********************************************
CCI/TEST:TES -LIST/PASS:PASS-CNT/FLAGS:FLAG-LIST/EOP:EOP-INCR
**********************************************************
```

THE DIAGNOSTIC EXECUTES THRU ALL OPERATOR DIALOGUE AND HALTS AT THE HARDWARE TEST CODE. NOW THE OPERATOR CAN DUMP THE CORE IMAGE TO THE MEDIUM WITH A BIC EXTENSION.

THE BIC FILE MUST BE HANDLED DIFFERENTLY DEPENDING ON WHETHER IT IS RUN MANUALLY OR IN CHAIN MODE. IF RUN MANUALLY IT CAN BE INVOKED EITHER WITH A "START" (IN WHICH CASE IT WILL BEHAVE LIKE THE BIN FILE: THE PRE-GENERATED ANSWERS TO OPERATOR QUESTIONS WILL BE IGNORED) OR WITH A "RESTART" (IN WHICH CASE THE PRE-GENERATED OPERATOR ANSWERS WILL BE USED).

IF RUN IN CHAIN MODE, AUTOMATIC EXECUTION WILL COMMENCE IMMEDIATELY FROM THE XXDP COMMAND ".R DIAG". THE COMMAND PROMPT "DS-B>" WILL NOT BE ISSUED.

ANY SWITCHES SPECIFIED ON THE CCI COMMAND WILL CAPRY OVER WHEN THE BIC FILE IS RUN IN CHAIN MODE (EXCEPT THAT UAM IS ALWAYS SET THERE) BUT WILL NOT CARRY OVER WHEN IT IS RUN MANUALLY.

TO DO A CCI ON A FULL SIZED DIAGNOSTIC (14.5K WORDS), A MACHINE SIZE LARGER THAN 16K IS REQUIRED. THE EXACT SIZE NEEDED DEPENDS ON WHICH UTILITY IS USED TO EXECUTE THE DIAGNOSTIC AT CCI TIME.

```
*********************
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 1
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 5
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 QUESTION #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 FLEXABILITY IN THE WAY THE PROGRAM BEHAVES. THE SOFTWARE PARAMETERS GIVE THE PROGRAM FLEXIBILITY IN THE WAY IT RUNS. THE PARAMETERS CAN BE MODIFIED ON A START, RESTART, OR CONTINUE BY ANSWERING (Y)ES TO THE FOLLOWING QUESTION:

"CHANGE S.W. ?"

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

"DROP ON ERROR LIMIT (L) Y?"

TO ALLOW THE UNIT TO BE DROPPED ONCE A PREDETERMINED NUMBER OF ER-

RORS ARE ENCOUNTERED.

ANSWER Y OR N

"ERROR LIMIT (D) 10?"

NUMBER OF ERRORS ALLOWED BEFORE DROPPING UNIT.

ANSWER 1 TO 65K

"AUTOSIZE (L) N?"

TO CHECK TO SEE IF UNIT SPECIFIED ACTUALLY EXISTS BEFORE TESTING IT (VIA DRIVE READY), IF NOT UNIT WILL NOT BE TESTED.

ANSWER Y OR N

3.0 ERROR INFORMATION

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

3.1 ERROR REPORTING

ALL ERROR INFORMATION IS PRINTED ON THE CONSOLE DECIVE. ERROR REPORTS ARE AIMED AT BEING SELF EXPLANATORY. THE GENERAL FORMAT IS:

```
  DZRL?  XXX    ERR  YYYYY   TST  ZZZ   SUB  PPP   PC:  RRRRRR

  WHERE:

        ?        IS PROGRAM LETTER
        XXX      IS SFT - SOFT ERROR
                    HRD - HARD ERROR
                 DV FAT - DEVICE FATAL ERROR
                SYS FAT - SYSTEM FATAL ERROR
        YYYYY    IS THE ERROR NUMBER
        ZZZ      IS THE TEST NUMBER
        PPP      IS THE SUBTEST NUMBER
        RRRRRR   IS THE PROGRAM LISTING LOCATION
```

ERRORS GIVE THE REGISTER CONTENTS BEFORE AND AFTER THE ERROR ALONG WITH A ONE LINE DESCRIPTION AND RELEVENT DATA.

EXAMPLE:

```
ONE LINE DESCRIPTION
(OPTIONAL SECOND LINE)
(OPTIONAL THIRD LINE)
BEFORE COMMAND: CS:XXXXXX BA:XXXXXX DA:XXXXXX MP:XXXXXX
TIME OF ERROR:  CS:XXXXXX BA:XXXXXX DA:XXXXXX MP:XXXXXX XXXXXX
 XXXXXX
```

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 COMPLIMENT)

          FOR READ HEADER FUNCTION
          ------------------------

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

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

          HAS DRIVE STATUS

          BIT 15 - WRITE DATA ERROR
          BIT 14 - CURRENT HEAD ERROR (CHE)
          BIT 13 - WRITE LOCK STATUS (WL)
          BIT 12 - SEEK TIME OUT (SKTO)
          BIT 11 - SPIN ERROR (SPE)
          BIT 10 - WRITE GATE ERROR (WGE)
          BIT  9 - VOLUME CHECK (VC)
          BIT  8 - DRIVE SELECT ERROR (DSE)
          BIT  7 - 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 - RLCS ADDRESSABILITY
     ******

          THIS TEST WILL CHECK THAT THE CONTROL AND STATUS REGISTER
          CAN BE ACCESSED.  IF THE REGISTER CANNOT BE ACCESSED THE
          PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO
          HANDLE THE TRAP.
```

TEST 2 - RLBA ADDRESSABILITY
******

THIS TEST WILL CHECK THAT THE BUS ADDRESS REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 3 - RLDA ADDRESSABILITY
******

THIS TEST WILL CHECK THAT THE DISK ADDRESS REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 4 - RLMP ADDRESSABILITY
******

THIS TEST WILL CHECK THAT THE MULTIPURPOSE REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 5 - READ WRITE OF RLCS
******

THIS TEST WILL ATTEMPT TO WRITE RLCS BITS 9-1 AND READ THEM BACK. WALKING AND GROWING 0'S AND 1'S ARE USED. BIT 7 (CONTROLLER READY) IS ALWAYS WRITTEN AS A 1 SO NOT TO INITIATE A FUNCTION. BITS 15, 14 AND 0 ARE TREATED AS DON'T CARE FOR THIS TEST.

TEST 6 - READ WRITE OF RLBA
******

THIS TEST WILL ATTEMPT TO WRITE RLBA BITS 15-0 AND READ THEM BACK. WALKING AND GROWING 0'S AND 1'S ARE USED. BIT 0 ON A RL11 SHOULD ALWAYS COME BACK AS A 0, WHILE ON AN RLV11 IT IS LOADABLE.

TEST 7 - READ WRITE OF RLDA
******

THIS TEST WILL ATTEMPT TO WRITE RLDA BITS 15-0 AND READ THEM BACK. WALKING AND GROWING 0'S AND 1'S ARE USED.

TEST 8 - BIS OF RLCS
******

```
        THIS TEST WILL USE THE 11 INSTRUCTION "BIS" TO SHOW THAT A
        READ-MODIFY-WRITE SEQUENCE OF THE RLCS WORKS.  BITS 9-1 ARE
        USED, BIT SETTING IN WALKING AND GROWING 0'S AND 1'S.  BIT
        7 (CONTROLLER READY) IS ALWAYS SET.  BITS 15, 14 AND 1 ARE
        DON'T CARES.

TEST 9 - BIC OF RLCS
******

        THIS TEST WILL USE THE 11 INSTRUCTION "BIC" TO SHOW THAT A
        READ-MODIFY-WRITE SEQUENCE OF THE RLCS WORKS.  BITS 9-1 ARE
        USED, BIT CLEARING IN WALKING AND GROWING 0'S AND 1'S.  BIT
        7 (CONTROLLER READY) IS ALWAYS SET.  BITS 15, 14 AND 1 ARE
        DON'T CARES.

TEST 10 - BIS OF RLBA
*******

        THIS TEST WILL USE THE 11 INSTRUCTION "BIS" TO SHOW THAT A
        READ-MODIFY-WRITE SEQUENCE OF THE RLBA WORKS.  BITS 15-0 ARE
        BIT SET USING GROWING AND WALKING 0'S AND 1'S.  BIT 0 CANNOT
        SET ON A RL11, BUT CAN ON A RLV11.

TEST 11 - BIC OF RLBA
*******

        THIS TEST WILL USE THE 11 INSTRUCTION "BIC" TO SHOW THAT A
        READ-MODIFY-WRITE SEQUENCE OF THE RLBA WORKS.  BITS 15-0 ARE
        BIT CLEARED USING GROWING AND WALKING 0'S AND 1'S.

TEST 12 - BIS OF RLDA
*******

        THIS TEST WILL USE THE 11 INSTRUCTION "BIS" TO SHOW THAT A
        READ-MODIFY-WRITE SEQUENCE OF THE RLDA WORKS.  BITS 15-0 ARE
        BIT SET USING GROWING AND WALKING 0'S AND 1'S.

TEST 13 - BIC OF RLDA
*******

        THIS TEST WILL USE THE 11 INSTRUCTION "BIC" TO SHOW THAT A
        READ-MODIFY-WRITE SEQUENCE OF THE RLDA WORKS.  BITS 15-0 ARE
        BIT CLEARED USING GROWING AND WALKING 0'S AND 1'S.

TEST 14 - BUS RESET OF RLCS
*******
```

```
        THIS TEST WILL VERIFY THAT THE BUS RESET OF THE PROCESSOR WILL
        CLEAR ALL BITS OF THE RLCS WITH THE EXCEPTION OF BIT 7 (CON-
        TROLLER READY), BIT 0 (DRIVE READY) AND BIT 15 (COMPOSITE ERROR)
        IF BIT 14 (DRIVE ERROR) IS SET.

TEST 15 - BUS RESET OF RLBA
*******

        THIS TEST WILL VERIFY TAHT THE BUS RESET OF THE PROCESSOR WILL
        CLEAR ALL BITS OF THE RLBA.

TEST 16 - BUS RESET OF RLDA
*******

        THIS TEST WILL VERIFY THAT THE BUS RESET OF THE PROCESSOR WILL
        CLEAR ALL BITS OF THE RLDA.

TEST 17 - UNIQUENESS OF RLCS
*******

        THIS TEST WILL VERIFY THAT WHEN THE RLCS (XXXXX0) IS ADDRESSED
        ONLY THAT REGISTER IS EFFECTED.   BOTH THE RLBA AND THE RLDA
        ARE SET UP WITH KNOWN DATA, THE RLDA IS WRITTEN, THEN THE RLBA
        AND RLDA ARE VERIFIED THAT THEY DID NOT CHANGE.

TEST 18 - UNIQUENESS OF RLBA
*******

        THIS TEST WILL VERIFY THAT WHEN THE RLBA (XXXXX2) IS ADDRESSED
        ONLY THAT REGISTER IS EFFECTED.  BOTH THE RLCS AND RLDA ARE
        WRITTEN WITH KNOWN DATA, THE RLBA IS WRITTEN, THEN THE RLCS
        AND RLDA ARE VERIFIED THAT THEY DID NOT CHANGE.

TEST 19 - UNIQUENESS OF RLDA
*******

        THIS TEST WILL VERIFY THAT WHEN THE RLDA (XXXXX4) IS ADDRESSED
        ONLY THAT REGISTER IS EFFECTED.  BOTH THE RLCS AND RLBA ARE
        WRITTEN WIEHT KNOWN DATA, THE RLDA IS WRITTEN, THEN THE RLCS
        AND RLBA ARE VERIFIED THAT THEY DID NOT CHANGE.

TEST 20 - UNIQUENESS OF RLMP
*******

        THIS TEST WILL VERIFY THAT WHEN THE RLMP (XXXXX6) IS ADDRESSED
        ONLY THAT REGISTER IS EFFECTED.  THE RLCS, RLBA AND RLDA ARE
```

WRITTEN WITH KNOW DATA. THE RLMP IS WRITTEN, THEN THE RLCS, RLBA AND RLDA ARE VERIFIED THAT THEY DID NOT CHANGE.

TEST 21 - NOOP FUNCTION
****

THIS TEST WILL VERIFY THE OPERATION OF THE NOOP (0) FUNCTION ON PDP-11'S ONLY, SINCE ON AN LSI-11 IT IS A MAINTENANCE FUNCTION. THE ABILITY OF CONTROLLER READY TO RESET AND NO ERRORS ARE CHECKED.

TEST 22 - TEST NOOP DOES NOTHING
****

THIS TEST WILL CHECK THAT THE NOOP FUNCTION WILL NOT DISTRUB ANY REGISTERS OF THE CONTROLLER.

TEST 23 - TEST OF INTERRUPT
****

THIS TEST WILL CAUSE AN INTERRUPT FROM THE CONTROLLER USING NOOP (RL11 ONLY) TO CHECK THE INTERRUPT LOGIC AND VECTOR.

TEST 24 - TEST PRIORITY BR LEVEL
****

THIS TEST WILL CHECK THAT THE PROPER PRIORITY IS ON THE BOARD. WE VERIFY THAT ABOVE THE LEVEL THE BOARD WILL NOT INTERRUPT AND BELOW IT, IT WILL.

TEST 25 - GET STATUS FUNCTION
****

THIS TEST WILL VERIFY THAT THE GET STATUS FUNCTION (2) WILL COMPLETE CORRECTLY. THE RLDA IS SET UP AND GET STATUS IS ISSUED. CONTROLLER READY IS CHECKED AS WELL AS ERROR BITS. (FIRST TEST A DRIVE MUST BE PRESENT.)

TEST 26 - GET STATUS FUNCTION INTERRUPT
****

THIS TEST WILL VERIFY THAT THE GET STATUS FUNCTION WILL GENERATE AN INTERRUPT ON COMPLETION.

TEST 27 - GET STATUS FUNCTION GENERATES OPI
****

```
          THIS TEST WILL PROVE THE ABILITY FOR OPI (OPERATION INCOM) TO
          SET AND THAT THE DRIVE COMMAND IS BEING TRANSMITTED CORRECTLY.
          THE COMMAND WORD (RLDA) IS SET UP WITH THE MARKER BIT ONLY.  AN
          OPI IS EXPECTED TO RESULT, THIS IS CHECKED.

TEST 28 - OPI UNDER INTERRUPT
*******

          THIS TEST WILL CHECK THE ABILITY OF AN OPI TO CAUSE AN INTERRUPT
          TO OCCUR.  WE SEND ONLY THE MARKER BIT WITH THE GET STATUS
          COMMAND AND EXPECT AN OPI ERROR.

TEST 30 - READ HEADER FUNCTION INTERRUPT
*******

          THIS TEST WILL CHECK THE ABILITY OF THE READ HEADER FUNCTION
          TO INTERRUPT ON COMPLETION.

TEST 31 - REPEATED RD HDRS YIELD SAME CYL AND HD
*******

          THIS TEST WILL CHECK THAT ON REPEATED READ HEADERS THE CYLINDER
          AND HEAD BITS OF THE HEADER WORD (RLMP) ARE ALWAYS THE SAME.

TEST 32 - CHECK OF HEADER CRC
*******

          THIS TEST WILL VERIFY THE HEADER CRC THAT FOLLOWS THE TWO
          HEADER WORDS IS ACTUALLY THE CORRECT CRC-16 CALCULATION OF
          THE TWO HEADER WORDS.

TEST 33 - CHECK CONSECUTIVE HEADERS
*******

          THIS TFST WILL CHECK THAT HEADERS ARE CONSECUTIVE.

TEST 34 - SEEK FUNCTION
*******

          THIS TEST WILL CHECK THE SEEK FUNCTION (3) TO RESET CONTROLLER
          READY AND POST NO ERRORS.   COMMAND WORD IS LOADED WITH A ONE
          CYLINDER FORWARD SEEK.

TEST 35 - CHECK DRIVE READY ON SEEK
*******
```

```
        THIS TEST WILL CHECK THAT DRIVE READY CLEARS AND RESETS ON
        ISSUEANCE OF A SEEK COMMAND.


TEST 36 - SEEK FUNCTION INTERRUPT
*******

        THIS TEST WILL CHECK THE ABILITY OF A SEEK COMMAND TO GENERATE
        AN INTERRUPT ON CONTROLLER READY RESETTING AND NOT ONE ON DRIVE
        READY RESETTING.


TEST 37 - TEST DIFFERENCE WORD TRANSMISSION
*******

        THIS TEST WILL TRY TO VERIFY THAT BITS 14-7, 6, 2, 0 OF THE
        COMMAND WORD GET TRANSMITTED CORRECTLY.  WE ISSUE SEEKS FROM
        TRACK 0 WITH COMMAND WORDS OF WALKING AND GROWING 0'S AND 1'S.
        ALL SEEKS ARE VERIFIED WITH A READ HEADER AND RETURN TO TRACK
        0 BEFORE NEXT PATTERN IS ISSUED.


TEST 38 - VERIFY HEAD SELECT 0 VIA RD HEADER
*******

        THIS TEST WILL VERIFY THAT HEAD 0 CAN BE SELECTED AND READ VIA
        READ HEADER.


TEST 39 - VERIFY HEAD SELECT 1 VIA RD HEADER
*******

        THIS TEST WILL VERIFY THAT HEAD 1 CAN BE SELECTED AND READ VIA
        READ HEADER.


TEST 40 - VERIFY HEAD SELECT 0 VIA GET STATUS
*******

        THIS TEST WILL VERIFY THE WORD RETURNED TO THE RLMP BY A GET
        STATUS CONTAINS THE RIGHT HEAD SELECT.


TEST 41 - VERIFY HEAD SELECT 1 VIA GET STATUS
*******

        THIS TEST WILL VERIFY THE WORD RETURNED TO THE RLMP BY A GET
        STATUS CONTAINS THE RIGHT HEAD SELECT.


TEST 42 - TEST TIME AT WHICH DP WD GETS
*******
```

THIS TEST WILL CHECK THAT THE DIFFERENCE WORD (RLDA) ACTUALLY DOES GET TRANSMITTED PRIOR TO CONTROLLER READY RESETTING. THIS IS DONE BY ISSUING A SEEK, WAITING FOR CONTROLLER READY AND RE-LOADING THE RLDA. THE SEEK IS THEN VERIFIED TO SEE IF IT IS CORRECT.

TEST 43 - EXTENSIVE CHECK OF CRC
****

THIS TEST WILL MORE EXTENSIVELY CHECK THE CRC LOGIC BY POSITIONING AT DIFFERENT POINTS ON THE PACK AND CHECKING THAT THE HEADER CRC RECEIVED IS CORRECT.

TEST 44 - VERIFY GET STATUS WHILE DRDY IS LOW
****

THIS TEST WILL CHECK THE ABILITY TO PERFORM A GET STATUS WHILE THE DRIVE IS SEEKING.

TABLE OF CONTENTS

```
                                         .TITLE  CZRLGAO RL11/RLV11 CTLR 1
                                         .ENABLE AMA
   000000                                .ENABLE ABS
                                         .NLIST  ME,CND,MD
                                         .MCALL SVC

   000000                                SVC
            000000                       SVCINS=0
            000000                       SVCTAG-0
            002000                       .=2000

   002000                                        POINTER BGNSFT,BGNSW,BGNDU,BGNAU

   002000                                BGNMOD  MDHEDR

   002000                                        HEADER  CZRLG,A,0,60,60,4,RL01
   002000      103                               .ASCII /C/
   002001      132                               .ASCII /Z/
   002002      122                               .ASCII /R/
   002003      114                               .ASCII /L/
   002004      107                               .ASCII /G/
   002005      000                               .BYTE   0
   002006      000                               .BYTE   0
   002007      000                               .BYTE   0
   002010      101                               .ASCII  /A/
   002011      060                               .ASCII  /0/
   002012   000000                               .WORD   0
   002014   000004                               .WORD   4
   002016   023734                               .WORD   L$HARD
   002020   024110                               .WORD   L$SOFT
   002022   011420                               .WORD   L$HW
   002024   011436                               .WORD   L$SW
   002026   024514                               .WORD   L$LAST
   002030   000000                               .WORD   0
   002032   000000                               .WORD   0
   002034   000000                               .WORD   0
   002036   000000                               .WORD   0
   002040   011446                               .WORD   L$DISPATCH
   002042   000000                               .WORD   0
   002044   000000                               .WORD   0
   002046   000000                               .WORD   0
   002050      002                               .BYTE   C$REVISION
   002051      002                               .BYTE   C$EDIT
   002052   000060                               .WORD   60
   002054   000060                               .WORD   60
   002056   000000                               .WORD   0
   002060   000000                               .WORD   0
   002062   000000                               .WORD   0
   002064   002114                               .WORD   L$DVTYP
   002066   000000                               .WORD   0
   002070   002112                               .WORD   L$DR
   002072   002112                               .WORD   L$DRST
   002074   012512                               .WORD   L$AU
   002076   012506                               .WORD   L$DU
   002100   000014                               .WORD   14
   002102   000000                               .WORD   0
   002104   011576                               .WORD   L$INIT
```

```
002106  012440                                  .WORD   L$CLEAN

002110                                          ENDMOD

002110                                          DEVREG
002110  000000                                  .WORD   0
                                                .BLKW

002114                                          DEVTYP  <RL01,RL02>
002114     122      114      060                .ASCIZ  /RL01,RL02/
002117     061      054      122
002122     114      060      062
002125     000
                                                .EVEN
002126                                  BGNMOD  GLBEQAT

002126                                          EQUALS
        000001                          DRDY=BIT0                 ;DRIVE READY (RLCS)
        000100                          INTEN=BIT6                ;INTERRUPT ENABLE (RLCS)
        100000                          ERR=BIT15                 ;RL11 ERROR (RLCS)
        040000                          DERR=BIT14                ;RL01 DRIVE ERROR (RLCS)
        002000                          OPI=BIT10                 ;OPERATION INCOMPLETE (RLCS)
        000200                          CRDY=BIT7                 ;CONTROLLER READY (RLCS)
        000040                          BA17=BIT5                 ;EXTENDED ADDRESS BIT 17 (RLCS)
        000020                          BA16=BIT4                 ;EXTENDED ADDRESS BIT 16 (RLCS)
        020000                          NXM=BIT13                 ;NON-EXISTANT MEMORY (RLCS)
        000000                          DS0=0                     ;DRIVE SELECT 0 (RLCS)
        000400                          DS1=BIT8                  ;DRIVE SELECT 1 (RLCS)
        001000                          DS2=BIT9                  ;DRIVE SELECT 2 (RLCS)
        001400                          DS3=BIT8!BIT9             ;DRIVE SELECT 3 (RLCS)
        000000                          NOOP0=0                   ;FUNCTION-NOOP(0)
        000016                          NOOP7=BIT1!BIT2!BIT3      ;FUNCTION-NOOP(7)
        000002                          WRCHK=BIT1                ;WRITE CHECK FUNCTION
        000004                          GSTAT=BIT2                ;GET STATUS FUNCTION
        000006                          SEEK=BIT2!BIT1            ;SEEK FUNCTION
        000010                          RDHDR=BIT3                ;READ HEADER FUNCTION
        000012                          WRITE=BIT3!BIT1           ;WRITE DATA FUNCTION
        000014                          READ=BIT3!BIT2            ;READ DATA FUNCTION
        000202                          GODRVR=BIT1!BIT7          ;CRDY AND DRDY
        000010                          DRST=BIT3                 ;DRIVE RESET (RLDA)
        000002                          GSBIT=BIT1                ;GET STATUS BIT (RLDA)
        000001                          MK=BIT0                   ;MARKER BIT (RLDA)
        000004                          SIGN=BIT2                 ;SIGN BIT (RLDA)
        000100                          RHHS=BIT6                 ;HEAD SELECT IN READ HEADER
        000100                          STHS=BIT6                 ;HEAD SELECT IN STATUS BACK
        000020                          DAHS=BIT4                 ;HEAD SELECT IN SEEK

                                        ;OFFSET FOR HARDWARE P-TABLE

        000000                          CSR=0
        000002                          VECT=2
        000004                          PRIOR=4
        000006                          TYPDR=6
        000010                          DRBT=10
        000012                          CNT=12

                                        ;OFFSET FOR SOFTWARE P-TABLE
```

```

              000000                  DLT=0
              000002                  ELT=2
              000004                  SIZE=4

       002126                                  ENDMOD

       002126                         BGNMOD   GLBDAT

                                      .SBTTL   GLOBAL DATA

       002126 000000                  PWRFLG:  .WORD   0
       002130 000000                  UUT:     .WORD   0
       002132 000000                  UNITST:  .WORD   0
       002134 000000                  RLCS:    .WORD   0
       002136 000000                  RLBA:    .WORD   0
       002140 000000                  RLDA:    .WORD   0
       002142 000000                  RLMP:    .WORD   0
       002144 000000                  BCSR:    .WORD   0
       002146 000000                  BPRIOR:  .WORD   0
       002150 000000                  BVEC:    .WORD   0
       002152 000000                  DRIVE:   .WORD   0                  ;DRIVE UNDER TEST
       002154 000000                  B.CS:    .WORD   0
       002156 000000                  B.BA:    .WORD   0
       002160 000000                  B.DA:    .WORD   0
       002162 000000                  B.MP:    .WORD   0
       002164 000000                  DERFLG:  .WORD
       002166 000000                  E.CS:    .WORD   0
       002170 000000                  E.BA:    .WORD   0
       002172 000000                  E.DA:    .WORD   0
       002174 000000                  E.MP:    .WORD   0
       002176 000000                  E.MP1:   .WORD   0
       002200 000000                  E.MP2:   .WORD   0
       002202 000000                  PFLG:    .WORD   0                  ;PROCESSOR TYPE  0=UNIBUS  1-Q-BUS
       002204 000000                  TRPFLG:  .WORD   0
       002206 000000                  INTFLG:  .WORD   0                  ;INTERRUPT OCCURANCE FLAG
       002210 000000                  LDCSR:   .WORD   0                  ;LOCATION TO FORM RLCS
       002212 000077                  SECMSK:  .WORD   77                 ;MASK OUT SECTOR
       002214 120001                  XPOLY:   .WORD   120001
       002216 000004                  ERRVEC:  .WORD   4
       002220 000000                  BCCFBK:  .WORD   0                  ;LOCATION USED BY "SIMBCC"
       002222 000000                  CALBCC:  .WORD   0                  ;LOCATION USED BY "SIMBCC"
       002224 000000                  TEMP2:   .WORD   0                  ;LOCATION USED BY "SIMBCC"
       002226 000000                  TEMP3:   .WORD   0                  ;LOCATION USED BY "SIMBCC"
       002230 000000                  TEMP4:   .WORD   0                  ;LOCATION USED BY "SIMBCC"
       002232 000000                  TMP0:    .WORD   0
       002234 000000                  TMP1:    .WORD   0
       002236 000000                  TMP2:    .WORD   0
       002240 000000                  GDDAT:   .WORD   0
       002242 000000                  BDDAT:   .WORD   0
       002244 000000                  FIRST:   .WORD   0                  ;FIRST SECTOR READ
       002246 177700                  CYLMSK:  .WORD   177700             ;MASK CYLINDER AND HEAD SELECT
       002250 000050                  MXSEC1:  .WORD   40.                ;MAX SECTOR ADDRESS +1
       002252 000047                  MAXSEC:  .WORD   39.                ;MAX SECTOR ADDRESS
       002254 000000                  DWORD:   .WORD   0                  ;DIFFERENCE WORD (SEEK)
       002256 177600                  MAXCYL:  .WORD   177600             ;MAXIMUM CYLINDER ADDRESS
       002260 000000                  SVHD:    .WORD   0                  ;SAVE CURRENT HEAD SELECT
```

```
    123 002262  000000              WHY:     .WORD   0               ;REASON FOR DROP IN AUTOSIZE
    124
    125 002264  000000              T.DRIVE:         .WORD   0
    126 002266  000000              T.CNTLR:         .WORD   0
    127 002270  000000              TMPFNC: .WORD   0
    128
    129                             .SBTTL  PATTERNS FOR REGISTER R/W
    130                             ;
    131                             ;PATTERNS USED FOR LOADING/READING REGISTERS
    132
    133 002272  000000              BEGPAT: 0                        ;GROWING 1
    134 002274  000001                      1
    135 002276  000003                      3
    136 002300  000007                      7
    137 002302  000017                      17
    138 002304  000037                      37
    139 002306  000077                      77
    140 002310  000177                      177
    141 002312  000377                      377
    142 002314  000777                      777
    143 002316  001777                      1777
    144 002320  003777                      3777
    145 002322  007777                      7777
    146 002324  017777                      17777
    147 002326  037777                      37777
    148 002330  077777                      77777
    149 002332  177777                      177777
    150 002334  177776                      177776                   ;GROWING 0
    151 002336  177774                      177774
    152 002340  177770                      177770
    153 002342  177760                      177760
    154 002344  177740                      177740
    155 002346  177700                      177700
    156 002350  177600                      177600
    157 002352  177400                      177400
    158 002354  177000                      177000
    159 002356  176000                      176000
    160 002360  174000                      174000
    161 002362  170000                      170000
    162 002364  160000                      160000
    163 002366  140000                      140000
    164 002370  100000                      100000
    165
    166 002372  000000                      000000
    167 002374  000001                      1                        ;WALKING 1
    168 002376  000002                      2
    169 002400  000004                      4
    170 002402  000010                      10
    171 002404  000020                      20
    172 002406  000040                      40
    173 002410  000100                      100
    174 002412  000200                      200
    175 002414  000400                      400
    176 002416  001000                      1000
    177 002420  002000                      2000
    178 002422  004000                      4000
    179 002424  010000                      10000
```

```
002426  020000                  20000
002430  040000                  40000
002432  100000                  100000
002434  177777                  177777                  ;WALKING 0
002436  177776                  177776
002440  177775                  177775
002442  177773                  177773
002444  177767                  177767
002446  177757                  177757
002450  177737                  177737
002452  177677                  177677
002454  177577                  177577
002456  177377                  177377
002460  176777                  176777
002462  175777                  175777
002464  173777                  173777
002466  167777                  167777
002470  157777                  157777
002472  137777                  137777
002474  077777                  077777
002476  177777                  177777
002500  000000          ENDPAT: 000000

                        .SBTTL  PATTERNS FOR DIFFERENCE WORD

002502  000200          SKLST:  .WORD   BIT7
002504  000400                  .WORD   BIT8            ;SHIFTING 1
002506  001000                  .WORD   BIT9
002510  002000                  .WORD   BIT10
002512  004000                  .WORD   BIT11
002514  010000                  .WORD   BIT12
002516  020000                  .WORD   BIT13
002520  040000                  .WORD   BIT14
002522  077600                  .WORD   77600           ;SHIFTING 0
002524  077400                  .WORD   77400
002526  076600                  .WORD   76600
002530  075600                  .WORD   75600
002532  073600                  .WORD   73600
002534  067600                  .WORD   67600
002536  057600                  .WORD   57600
002540  037600                  .WORD   37600
002542  077600                  .WORD   77600
002544  000200                  .WORD   200
002546  000600                  .WORD   600             ;GROWING 1
002550  001600                  .WORD   1600
002552  003600                  .WORD   3600
002554  007600                  .WORD   7600
002556  017600          QUAMAX: .WORD   17600
002560  037600          HALMAX: .WORD   37600
002562  077600                  .WORD   77600
002564  077400                  .WORD   77400           ;GROWING 0
002566  077000                  .WORD   77000
002570  076000                  .WORD   76000
002572  074000                  .WORD   74000
002574  070000                  .WORD   70000
002576  060000                  .WORD   60000
002600  040000                  .WORD   40000
```

```
002602  000000            SKEND:  .WORD   00000
002604  100000            RL2:    .WORD   BIT15
002606  037600            QMAX:   .WORD   37600
002610  077600            HMAX:   .WORD   77600

002612  177600                    .WORD   177600
002614  177400                    .WORD   177400
002616  176600                    .WORD   176600
002620  173600                    .WORD   173600
002622  167600                    .WORD   167600
002624  157600                    .WORD   157600
002626  137600                    .WORD   137600
002630  177000                    .WORD   177000
002632  176000                    .WORD   176000
002634  174000                    .WORD   174000
002636  170000                    .WORD   170000
002640  060000                    .WORD   60000
002642  040000                    .WORD   40000
002644  000000            SKEEND: .WORD   000000

                          ;PATTERNS FOR TEST OF RLCS

002646  000000            CSPAT:  .WORD   0               ;SHIFTING 1
002650  000002                    .WORD   BIT1
002652  000004                    .WORD   BIT2
002654  000010                    .WORD   BIT3
002656  000020                    .WORD   BIT4
002660  000040                    .WORD   BIT5
002662  000100                    .WORD   BIT6
002664  000400                    .WORD   BIT8
002666  001000                    .WORD   BIT9
002670  001576                    .WORD   1576            ;GROWING 0
002672  001574                    .WORD   1574
002674  001570                    .WORD   1570
002676  001560                    .WORD   1560
002700  001540                    .WORD   1540
002702  001500                    .WORD   1500
002704  001400                    .WORD   1400
002706  001576                    .WORD   1576            ;SHIFT 0
002710  001574                    .WORD   1574
002712  001566                    .WORD   1566
002714  001556                    .WORD   1556
002716  001536                    .WORD   1536
002720  001436                    .WORD   1436
002722  001136                    .WORD   1136
002724  000076                    .WORD   76
002726  000006                    .WORD   6               ;GROWING 1
002730  000016                    .WORD   16
002732  000036                    .WORD   36
002734  000076                    .WORD   76
002736  000176                    .WORD   176             ;
002740  000576                    .WORD   576
002742  001576                    .WORD   1576
002744  000000            CSEND:  .WORD   0
002746  000000            ERPOINT: .WORD  0
002750                    ERCOUNT: .BLKW  64.
003150                    HDRBUF: .BLKW   160.
```

```
294 003650                              ENDMOD
295
296 003650                              BGNMOD  GLBTXT
297                                     .SBTTL  GLOBAL TEXT
298
302 003650      116     117     040     NORES:  .ASCIZ  /NO CONTROLLER/
303 003666      116     117     040     NODRY:  .ASCIZ  /NO DRIVE CONNECTED/
304 003711      040     104     122     DEMES:  .ASCIZ  / DRV/
305 003716      040     116     130     NXMMES: .ASCIZ  / NXM/
306 003723      040     117     120     OPIMES: .ASCIZ  / OPI/
307 003730      040     110     103     HCRCMES:.ASCIZ  / HCRC/
308 003736      040     110     116     HNFMES: .ASCIZ  / HNF/
309 003743      040     104     103     DCKMES: .ASCIZ  / DCK/
310 003750      040     104     114     DLTMES: .ASCIZ  / DLT/
311 003755      015     012     000     MSCRLF: .ASCIZ  <15><12>
312 003760      015     000             LF:     .ASCIZ  <15>
313 003762      040     103     117     COMP:   .ASCIZ  / COMP/
314 003770      106     117     122     OPIERR: .ASCIZ  /FORCED OPI(GET STATUS) CAUSED OTHER ERRORS/
315 004043      116     117     117     NOPMES: .ASCIZ  /NOOP OPERATION-FLAG MODE/
316 004074      116     117     117     NOPINT: .ASCIZ  /NOOP OPERATION-INTR. MODE/
317 004126      127     122     111     WCKMES: .ASCIZ  /WRITE CHECK OPERATION-FLAG MODE/
318 004166      127     122     111     WCKINT: .ASCIZ  /WRITE CHECK OPERATION-INTR. MODE/
319 004227      122     105     101     RHDMES: .ASCIZ  /READ HEADER OPERATION-FLAG MODE/
320 004267      122     105     101     RHDINT: .ASCIZ  /READ HEADER OPERATION-INTR. MODE/
321 004330      123     105     105     SEKMES: .ASCIZ  /SEEK OPERATION-FLAG MODE/
322 004361      123     105     105     SEKINT: .ASCIZ  /SEEK OPERATION-INTR. MODE/
323 004413      107     105     124     GSTMES: .ASCIZ  /GET STATUS OPERATION-FLAG MODE/
324 004452      107     105     124     GSTINT: .ASCIZ  /GET STATUS OPERATION-INTR MODE/
325 004511      103     123     072     ARLCS:  .ASCIZ  /CS: /
326 004516      040     102     101     ARLBA:  .ASCIZ  / BA: /
327 004524      040     104     101     ARLDA:  .ASCIZ  / DA: /
328 004532      040     115     120     ARLMP:  .ASCIZ  / MP: /
329 004540      102     105     106     BEREG:  .ASCIZ  /BEFORE COMMAND: /
330 004561      124     111     115     AFREG:  .ASCIZ  /TIME OF ERROR:  /
331 004602      103     117     116     CRTIM:  .ASCIZ  /CONTROLLER TIMED OUT/
332 004627      104     122     111     DRTIM:  .ASCIZ  /DRIVE READY TIMED OUT/
333 004655      103     101     116     EM1:    .ASCIZ  /CAN NOT ADDRESS RLCS/
334 004702      103     101     116     EM2:    .ASCIZ  /CAN NOT ADDRESS RLBA/
335 004727      103     101     116     EM3:    .ASCIZ  /CAN NOT ADDRESS RLDA/
336 004754      103     101     116     EM4:    .ASCIZ  /CAN NOT ADDRESS RLMP/
337 005001      122     114     103     EM5:    .ASCIZ  %RLCS READ/WRITE ERROR (BIT 0 DON'T CARE)%
338 005052      122     114     102     EM6:    .ASCIZ  %RLBA READ/WRITE ERROR%
339 005100      122     114     104     EM7:    .ASCIZ  %RLDA READ/WRITE ERROR%
340 005126      117     120     111     EM11:   .ASCIZ  /OPI WOULD NOT GENERATE INTERRUPT/
341 005167      116     117     040     EM13:   .ASCIZ  /NO INTERRUPT FROM NOOP(0)/
342 005221      116     117     117     EM14:   .ASCIZ  /NOOP(0) MODIFIED RLMP/
343 005247      116     117     117     EM15:   .ASCIZ  /NOOP(0) MODIFIED RLBA/
344 005275      116     117     117     EM16:   .ASCIZ  /NOOP(0) MODIFIED RLDA/
345 005323      111     116     124     EM17:   .ASCIZ  /INTERRUPT PRIORITY FAILURE/
346 005356      107     105     124     EM30:   .ASCIZ  /GET STATUS WOULD NOT INTERRUPT/
347 005415      107     105     124     EM30A:  .ASCIZ  /GET STATUS SHOULD NOT INTERRUPT/
348 005455      122     114     115     EM32:   .ASCIZ  /RLMP CONTAINED WRONG STATUS/
349 005511      117     120     111     EM33:   .ASCIZ  /OPI DID NOT SET-GSTAT WITHOUT GS BIT/
350 005556      117     120     111     EM34:   .ASCIZ  /OPI DID NOT SET-GSTAT WITHOUT GS AND MK BITS/
351 005633      122     105     101     EM37:   .ASCIZ  /READ HEADER WOULD NOT INTERRUPT/
352 005673      102     101     104     EM41:   .ASCIZ  /BAD CYLINDER OR HEAD SELECT IN REPEATED READ HEADER TEST/
353 005764      102     101     104     EM42:   .ASCIZ  /BAD HEADER CRC ON READ HEADER/
```

```
006022    123    105    103  EM43:   .ASCIZ  /SECTOR ADDRESS OUT OF SEQUENCE DURING CONSECUTIVE READ HEADERS/
006121    127    122    111  EM44:   .ASCIZ  /WRITING RLMP MODIFIED RLCS/
006154    127    122    111  EM45:   .ASCIZ  /WRITING RLMP MODIFIED RLBA/
006207    127    122    111  EM46:   .ASCIZ  /WRITING RLMP MODIFIED RLDA/
006242    123    105    105  EM47:   .ASCIZ  /SEEK WOULD NOT INTERRUPT/
006273    104    122    111  EM52:   .ASCIZ  /DRIVE READY CAUSED EXTRANEOUS INTERRUPT/
006343    102    101    104  EM54:   .ASCIZ  /BAD SEEK-TEST OF DIFFENCE WORD/
006402    102    101    104  EM55:   .ASCIZ  /BAD HEAD SELECT VIA RD HDR/
006435    102    101    104  EM56:   .ASCIZ  /BAD HEAD SELECT VIA GET STATUS/
006474    114    117    101  EM57:   .ASCII  /LOADING RLDA BEFORE DRIVE READY ON SEEK/<15><12>
006545    104    122    111          .ASCIZ  /DRIVE READY DID NOT SET/
006575    102    111    124  EM61:   .ASCIZ  /BIT SET INSTRUCTION ON RLCS YIELDED WRONG RESULT/
006656    102    111    124  EM62:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLCS YIELDED WRONG RESULT/
006741    102    111    124  EM63:   .ASCIZ  /BIT SET INSTRUCTION ON RLBA YIELDED WRONG RESULT/
007022    102    111    124  EM64:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLBA YIELDED WRONG RESULT/
007105    102    111    124  EM65:   .ASCIZ  /BIT SET INSTRUCTION ON RLDA YIELDED WRONG RESULT/
007166    102    111    124  EM66:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLDA YIELDED WRONG RESULT/
007251    102    125    123  EM67:   .ASCIZ  /BUS RESET DID NOT CLEAR RLCS/
007306    102    125    123  EM70:   .ASCIZ  /BUS RESET DID NOT CLEAR RLBA/
007343    102    125    123  EM71:   .ASCIZ  /BUS RESET DID NOT CLEAR RLDA/
007400    127    122    111  EM72:   .ASCIZ  /WRITING RLCS MODIFIED RLBA/
007433    127    122    111  EM73:   .ASCIZ  /WRITING RLCS MODIFIED RLDA/
007466    127    122    111  EM74:   .ASCIZ  /WRITING RLBA MODIFED RLCS/
007520    127    122    111  EM75:   .ASCIZ  /WRITING RLBA MODIFED RLDA/
007552    127    122    111  EM76:   .ASCIZ  /WRITING RLDA MODIFIED RLCS/
007605    127    122    111  EM77:    ASCIZ  /WRITING RLDA MODIFIED RLBA/
007640    122    114    103  EM101:  .ASCIZ  /RLCS CONTAINED FOLLOWING ERROR(S):  /
007705                       EM102:  .BLKB   120.

                             .EVEN

010076                               ENDMOD

                             .SBTTL  GLOBAL ERRORS

010076                       BGNMOD  GLBERR

010076                       BGNMSG  ERR0

010076  004737  010422               JSR     PC,LINE1
010102  004737  010456               JSR     PC,LINE2

010106  004537  012516               JSR     R5,CKERLT          ;CHECK ERROR LIMIT
010112                               ENDMSG
010112                       L10000:
010112  104023                       EMT     C$MSG

010114                       BGNMSG  ERR1

010114  004737  010422               JSR     PC,LINE1

010120  004537  012516               JSR     R5,CKERLT          ;CHECK ERROR LIMIT
010124                               ENDMSG
010124                       L10001:
010124  104023                       EMT     C$MSG
```

```
      1
      2 010126                         BGNMSG  ERR2
      3
      4 010126  004737  010422                 JSR     PC,LINE1
      5 010132                                 PRINTB  #FRMT4,GDDAT,BDDAT
        010132  013746  002242                 MOV     BDDAT,-(SP)
        010136  013746  002240                 MOV     GDDAT,-(SP)
        010142  012746  011100                 MOV     #FRMT4,-(SP)
        010146  012746  000003                 MOV     #3,-(SP)
        010152  010600                         MOV     SP,R0
        010154  104014                         EMT     C$PNTB
        010156  062706  000010                 ADD     #10,SP
      6
      7 010162  004537  012516                 JSR     R5,CKERLT        ;CHECK ERROR LIMIT
      8 010166                                 ENDMSG
        010166                         L10002:
        010166  104023                         EMT     C$MSG
      9
     10 010170                         BGNMSG  ERR3
     11
     12 010170  004737  010422                 JSR     PC,LINE1
     13 010174  004737  010456                 JSR     PC,LINE2
     14 010200                                 PRINTB  #FRMT5,TMP0,BDDAT,GDDAT
        010200  013746  002240                 MOV     GDDAT,-(SP)
        010204  013746  002242                 MOV     BDDAT,-(SP)
        010210  013746  002232                 MOV     TMP0,-(SP)
        010214  012746  011136                 MOV     #FRMT5,-(SP)
        010220  012746  000004                 MOV     #4,-(SP)
        010224  010600                         MOV     SP,R0
        010226  104014                         EMT     C$PNTB
        010230  062706  000012                 ADD     #12,SP
     15
     16 010234  004537  012516                 JSR     R5,CKERLT        ;CHECK ERROR LIMIT
     17 010240                                 ENDMSG
        010240                         L10003:
        010240  104023                         EMT     C$MSG
     18
     19 010242                         BGNMSG  ERR4
     20
     21 010242  004737  010422                 JSR     PC,LINE1
     22 010246  004737  010456                 JSR     PC,LINE2
     23 010252                                 PRINTB  #FRMT4,GDDAT,BDDAT
        010252  013746  002242                 MOV     BDDAT,-(SP)
        010256  013746  002240                 MOV     GDDAT,-(SP)
        010262  012746  011100                 MOV     #FRMT4,-(SP)
        010266  012746  000003                 MOV     #3,-(SP)
        010272  010600                         MOV     SP,R0
        010274  104014                         EMT     C$PNTB
        010276  062706  000010                 ADD     #10,SP
     24
     25 010302  004537  012516                 JSR     R5,CKERLT        ;CHECK ERROR LIMIT
     26 010306                                 ENDMSG
        010306                         L10004:
        010306  104023                         EMT     C$MSG
     27
     28 010310                         BGNMSG  ERR5
     29
```

```
010310  004737  010422                  JSR     PC,LINE1

010314  004537  012516                  JSR     R5,CKERLT           ;CHECK ERROR LIMIT
010320                                  ENDMSG
010320                          L10005:
010320  104023                          EMT     C$MSG

010322                          BGNMSG  ERR6

010322  004737  010422                  JSR     PC,LINE1
010326  004737  010700                  JSR     PC,LINE3
010332  004737  010456                  JSR     PC,LINE2


010336                          1$:     PRINTB  #FRMT99
010336  012746  011133                  MOV     #FRMT99,-(SP)
010342  012746  000001                  MOV     #1,-(SP)
010346  010600                          MOV     SP,R0
010350  104014                          EMT     C$PNTB
010352  062706  000004                  ADD     #4,SP
010356  004537  012516                  JSR     R5,CKERLT           ;CHECK ERROR LIMIT
010362                                  ENDMSG
010362                          L10006:
010362  104023                          EMT     C$MSG

010364                          BGNMSG  ERR7

010364  004737  010422                  JSR     PC,LINE1
010370                                  PRINTB  #FRMT6,BDDAT
010370  013746  002242                  MOV     BDDAT,-(SP)
010374  012746  011207                  MOV     #FRMT6,-(SP)
010400  012746  000002                  MOV     #2,-(SP)
010404  010600                          MOV     SP,R0
010406  104014                          EMT     C$PNTB
010410  062706  000006                  ADD     #6,SP

010414  004537  012516                  JSR     R5,CKERLT

010420                                  ENDMSG
010420                          L10007:
010420  104023                          EMT     C$MSG

010422                          LINE1:  PRINTB  #FRMT1,RLCS,<B,DRIVE+1>
010422  005046                          CLR     -(SP)
010424  153716  002153                  BISB    DRIVE+1,(SP)
010430  013746  002134                  MOV     RLCS,-(SP)
010434  012746  010752                  MOV     #FRMT1,-(SP)
010440  012746  000003                  MOV     #3,-(SP)
010444  010600                          MOV     SP,R0
010446  104014                          EMT     C$PNTB
010450  062706  000010                  ADD     #10,SP
010454  000207                          RTS     PC

010456                          LINE2:  PRINTB  #FRMT2,#BEREG,#ARLCS,B.CS,#ARLBA,B.BA
010456  013746  002156                  MOV     B.BA,-(SP)
010462  012746  004516                  MOV     #ARLBA,-(SP)
010466  013746  002154                  MOV     B.CS,-(SP)
```

```
      010472  012746  004511                  MOV     #ARLCS,-(SP)
      010476  012746  004540                  MOV     #BEREG,-(SP)
      010502  012746  011012                  MOV     #FRMT2,-(SP)
      010506  012746  000006                  MOV     #6,-(SP)
      010512  010600                          MOV     SP,R0
      010514  104014                          EMT     C$PNTB
      010516  062706  000016                  ADD     #16,SP
   59 010522                                  PRINTB  #FRMT2A,#ARLDA,B.DA,#ARLMP,B.MP
      010522  013746  002162                  MOV     B.MP,-(SP)
      010526  012746  004532                  MOV     #ARLMP,-(SP)
      010532  013746  002160                  MOV     B.DA,-(SP)
      010536  012746  004524                  MOV     #ARLDA,-(SP)
      010542  012746  011031                  MOV     #FRMT2A,-(SP)
      010546  012746  000005                  MOV     #5,-(SP)
      010552  010600                          MOV     SP,R0
      010554  104014                          EMT     C$PNTB
      010556  062706  000014                  ADD     #14,SP
   60 010562                                  PRINTB  #FRMT2,#AFREG,#ARLCS,E.CS,#ARLBA,E.BA
      010562  013746  002170                  MOV     E.BA,-(SP)
      010566  012746  004516                  MOV     #ARLBA,-(SP)
      010572  013746  002166                  MOV     E.CS,-(SP)
      010576  012746  004511                  MOV     #ARLCS,-(SP)
      010602  012746  004561                  MOV     #AFREG,-(SP)
      010606  012746  011012                  MOV     #FRMT2,-(SP)
      010612  012746  000006                  MOV     #6,-(SP)
      010616  010600                          MOV     SP,R0
      010620  104014                          EMT     C$PNTB
      010622  062706  000016                  ADD     #16,SP
   61 010626                                  PRINTB  #FRMT2B,#ARLDA,E.DA,#ARLMP,E.MP,E.MP1,E.MP2
      010626  013746  002200                  MOV     E.MP2,-(SP)
      010632  013746  002176                  MOV     E.MP1,-(SP)
      010636  013746  002174                  MOV     E.MP,-(SP)
      010642  012746  004532                  MOV     #ARLMP,-(SP)
      010646  013746  002172                  MOV     E.DA,-(SP)
      010652  012746  004524                  MOV     #ARLDA,-(SP)
      010656  012746  011044                  MOV     #FRMT2B,-(SP)
      010662  012746  000007                  MOV     #7,-(SP)
      010666  010600                          MOV     SP,R0
      010670  104014                          EMT     C$PNTB
      010672  062706  000020                  ADD     #20,SP
   62 010676  000207                          RTS     PC
   63
   64 010700                          LINE3:  PRINTB  #FRMT3,#EM101
      010700  012746  007640                  MOV     #EM101,-(SP)
      010704  012746  011073                  MOV     #FRMT3,-(SP)
      010710  012746  000002                  MOV     #2,-(SP)
      010714  010600                          MOV     SP,R0
      010716  104014                          EMT     C$PNTB
      010720  062706  000006                  ADD     #6,SP
   65 010724                                  PRINTB  #FRMT3,#EM102
      010724  012746  007705                  MOV     #EM102,-(SP)
      010730  012746  011073                  MOV     #FRMT3,-(SP)
      010734  012746  000002                  MOV     #2,-(SP)
      010740  010600                          MOV     SP,R0
      010742  104014                          EMT     C$PNTB
      010744  062706  000006                  ADD     #6,SP
   66 010750  000207                          RTS     PC
```

```


010752    045     101     103   FRMT1:  .ASCIZ  /%ACONTROLLFR: %06%A  DRIVE: %01/
011012    045     116     045   FRMT2:  .ASCIZ  /%N%T%T%06%T%06/
011031    045     124     045   FRMT2A: .ASCIZ  /%T%06%T%06/
011044    045     124     045   FRMT2B: .ASCIZ  /%T%06%T%06%A %06%A %06/
011073    045     116     045   FRMT3:  .ASCIZ  /%N%T/
011100    045     116     045   FRMT4:  .ASCII  /%N%AEXP'D: %06%A REC'D: %06/
011133    045     116     000   FRMT99: .ASCIZ  /%N/
011136    045     116     045   FRMT5:  .ASCIZ  /%N%ALAST: %06%A PRES: %06%A EXP'D: %06%N/
011207    045     116     045   FRMT6:  .ASCIZ  /%N%AAT PROCESSOR LEVEL %06%N/
011244    045     101     105   FRMT11: .ASCIZ  /%AERROR LIMIT EXCEEDED-DROPPED%N/
011305    045     116     045   FRMT12: .ASCIZ  /%N%ADRIVE DID NOT RECOVER FROM POWER FAILURE%N/
011364    045     116     045   FRMT13: .ASCIZ  /%N%T%A - WILL NOT TEST%N/

                                .EVEN





011416                                  ENDMOD

011416                          BGNMOD  HPTCODE

011416                          BGNHW
011416  000006                          .WORD   L10010-L$HW/2
011420  174400                          .WORD   174400          ;CSR
011422  000160                          .WORD   160             ;VECTOR
011424  000240                          .WORD   240             ;PRIORITY
011426  000001                          .WORD   1               ;RL01 = 1
011430  000000                          .WORD   0               ;DRIVE (BITS 8,9,10)
011432  000001                          .WORD   1               ;RL11 - 1, RLV11 - 0

011434                          ENDHW
011434                          L10010:

011434                                  ENDMOD

011434                          BGNMOD  SPTCODE

011434                          BGNSW
011434  000003                          .WORD   L10011-L$SW/2

011436  000000                  DROP:   .WORD   0
011440  000012                  MERLMT: .WORD   10.
011442  000000                  T.SIZE: .WORD   0

011444                          ENDSW
011444                          L10011:

011444                                  ENDMOD

011444                          BGNMOD  DSPCODE

011444                          DISPATCH        44
011444  000054                          .WORD   44
```

```
         011446  013770                          .WORD   T1
         011450  014064                          .WORD   T2
         011452  014160                          .WORD   T3
         011454  014254                          .WORD   T4
         011456  014350                          .WORD   T5
         011460  014470                          .WORD   T6
         011462  014572                          .WORD   T7
         011464  014660                          .WORD   T8
         011466  015004                          .WORD   T9
         011470  015130                          .WORD   T10
         011472  015234                          .WORD   T11
         011474  015334                          .WORD   T12
         011476  015424                          .WORD   T13
         011500  015524                          .WORD   T14
         011502  015634                          .WORD   T15
         011504  015706                          .WORD   T16
         011506  015744                          .WORD   T17
         011510  016070                          .WORD   T18
         011512  016230                          .WORD   T19
         011514  016370                          .WORD   T20
         011516  016574                          .WORD   T21
         011520  016624                          .WORD   T22
         011522  017030                          .WORD   T23
         011524  017114                          .WORD   T24
         011526  017260                          .WORD   T25
         011530  017310                          .WORD   T26
         011532  017462                          .WORD   T27
         011534  017550                          .WORD   T28
         011536  017676                          .WORD   T29
         011540  017720                          .WORD   T30
         011542  020000                          .WORD   T31
         011544  020144                          .WORD   T32
         011546  020302                          .WORD   T33
         011550  020620                          .WORD   T34
         011552  020656                          .WORD   T35
         011554  020722                          .WORD   T36
         011556  021046                          .WORD   T37
         011560  021464                          .WORD   T38
         011562  021616                          .WORD   T39
         011564  021760                          .WORD   T40
         011566  022120                          .WORD   T41
         011570  022272                          .WORD   T42
         011572  022720                          .WORD   T43
         011574  023440                          .WORD   T44
    125
    126  011576                                  ENDMOD
    127
    128                                  .SBTTL  INITIALIZATION CODE
    129  011576                          BGNMOD  INITCODE
    130
    131  011576                                  BGNINIT
    132
    133  011576                                  BRESET
         011576  104033                          EMT     C$RESET
    134  011600                                  READEF  #EF.PWR                 ;POWER UP?????
         011600  012700  000034                  MOV     #EF.PWR,R0
         011604  104050                          EMT     C$REFG
    135 011606                                  BNCOMPLETE      NOPWR           ;NO,BRANCH
        011606  103004                          BCC     NOPWR
    136 011610  013737  002012  002126          MOV     L$UNIT,PWRFLG           ;YES, SET POWER FLAG
    137 011616  000475                          BR      CONT                    ;GO TO CONTINUE POINT
    138 011620                          NOPWR:  READEF  #EF.RESTART     ;RESTART?
        011620  012700  000037                  MOV     #EF.RESTART,R0
        011624  104050                          EMT     C$REFG
    139 011626                                  BCOMPLETE START1
        011626  103404                          BCS     START1
    140 011630                                  READEF  #EF.START               ;START???
        011630  012700  000040                  MOV     #EF.START,R0
        011634  104050                          EMT     C$REFG
    141 011636                                  BNCOMPLETE      CONTINUE
        011636  103010                          BCC     CONTINUE
    142 011640  012700  002750          START1: MOV     #ERCOUNT,R0
    143 011644  012701  000100                  MOV     #64.,R1
    144 011650  005020                  1$:     CLR     (R0)+
    145 011652  005301                          DEC     R1
    146 011654  001375                          BNE     1$
    147 011656  000407                          BR      START
    148
    149 011660                          CONTINUE:       READEF  #EF.CONTINUE    ;CONTINUE????
        011660  012700  000036                  MOV     #EF.CONTINUE,R0
        011664  104050                          EMT     C$REFG
    150 011666                                  BCOMPLETE       CONT
        011666  103451                          BCS     CONT
    151
    152 011670  005737  002130          NXT:    TST     UUT                     ;DONE ALL UUT'S
    153 011674  001011                          BNE     XXX                     ;NO
    154 011676  012737  177777  002132  START:  MOV     #-1,UNITST
    155 011704  013737  002012  002130          MOV     L$UNIT,UUT
    156 011712  012737  002746  002746          MOV     #ERCOUNT-2,ERPOINT
    157
    158 011720  005237  002132          XXX:    INC     UNITST
    159 011724  062737  000002  002746          ADD     #2,ERPOINT
    160 011732  005337  002130                  DEC     UUT
    161 011736                          REST:   GPHARD  UNITST,R0
        011736  013700  002132                  MOV     UNITST,R0
        011742  104042                          EMT     C$GPHRD
    162 011744                                  BCOMPLETE       1$
        011744  103406                          BCS     1$
    163 011746  005737  002126                  TST     PWRFLG                  ;POWER FLAG TO 0
    164 011752  001746                          BEQ     NXT                     ;YES, DONT DEC IT
    165 011754  005337  002126                  DEC     PWRFLG
    166 011760  000743                          BR      NXT                     ;GET NEXT ONE
    167 011762  012037  002144          1$:     MOV     (R0)+,BCSR
    168 011766  012037  002150                  MOV     (R0)+,BVEC
    169 011772  012037  002146                  MOV     (R0)+,BPRIOR
    170 011776  012037  002264                  MOV     (R0)+,T.DRIVE
    171 012002  012037  002152                  MOV     (R0)+,DRIVE
    172 012006  012037  002266                  MOV     (R0)+,T.CNTLR   ;GET CONTROLLER TYPE
    173
    174 012012  013700  002144          CONT:   MOV     BCSR,R0
    175 012016  010037  002134                  MOV     R0,RLCS
    176 012022  062700  000002                  ADD     #2,R0
    177 012026  010037  002136                  MOV     R0,RLBA
    178 012032  062700  000002                  ADD     #2,R0
```

```
012036  010037  002140                  MOV     R0,RLDA
012042  062700  000002                  ADD     #2,R0
012046  010037  002142                  MOV     R0,RLMP
012052  005737  002126                  TST     PWRFLG
012056  001064                          BNE     5$
012060  005737  011442                  TST     T.SIZE                  ;DO WE WANT TO CHECK UNITS??
012064  001461                          BEQ     5$                      ;NO

012066  005037  002204                  CLR     TRPFLG                  ;CLR OUT TRAP FLAG
012072                                  SETVEC  ERRVEC,#TRPHAN,#340     ;SETUP VECTOR TO CATCH NON-EXIST
012072  012746  000340                  MOV     #340,-(SP)
012076  012746  013632                  MOV     #TRPHAN,-(SP)
012102  013746  002216                  MOV     ERRVEC,-(SP)
012106  012746  000003                  MOV     #3,-(SP)
012112  104037                          EMT     C$SVEC
012114  062706  000010                  ADD     #10,SP
012120  005777  170010                  TST     @RLCS                   ;ACCESS CONTROLLER
012124                                  CLRVEC  ERRVEC                  ;RELEASE VECTOR
012124  013700  002216                  MOV     ERRVEC,R0
012130  104036                          EMT     C$CVEC
012132  005737  002204                  TST     TRPFLG                  ;DID IT TRAP
012136  001404                          BEQ     7$                      ;NO, CHECK IT'S DRIVE
012140  012737  003650  002262          MOV     #NORES,WHY              ;SETUP ERR MESS
012146  000415                          BR      8$

012150  012777  000200  167756  7$:     MOV     #200,@RLCS              ;CONTROLLER READY
012156  053777  002152  167750          BIS     DRIVE,@RLCS             ;SELECT DRIVE
012164  032777  000001  167742          BIT     #1,@RLCS                ;DRIVE THERE
012172  001016                          BNE     5$                      ;YES
012174  012737  003666  002262          MOV     #NODRY,WHY              ;SETUP ERR MESS
012202                          8$:     PRINTB  #FRMT13,WHY
012202  013746  002262                  MOV     WHY,-(SP)
012206  012746  011364                  MOV     #FRMT13,-(SP)
012212  012746  000002                  MOV     #2,-(SP)
012216  010600                          MOV     SP,R0
012220  104014                          EMT     C$PNTB
012222  062706  000006                  ADD     #6,SP
012226  000434                          BR      6$

012230  005737  002126          5$:     TST     PWRFLG                  ;RECENT POWER FAILURE????
012234  001457                          BEQ     END                     ;NO

                                ;THERE WAS A RECENT POWER FAILURE, THEREFORE WE WILL WAIT
                                ;SIXTY SECONDS FOR THE DRIVE TO COME READY

012236  012701  000074                  MOV     #60.,R1                 ;SIXTY SECOND TIMEOUT
012242  012777  000200  167664          MOV     #200,@RLCS              ;SET CRDY
012250  053777  002152  167656          BIS     DRIVE,@RLCS             ;SET IN DRIVE SELECT
012256  032777  000001  167650  2$:     BIT     #DRDY,@RLCS             ;DRIVE READY???
012264  001023                          BNE     3$                      ;YES, THEN START TEST

012266                                  WAITMS  #10.                    ;WAIT A SECOND
012266  012700  000012                  MOV     #10.,R0
012272  104026                          EMT     C$WTM

012274  005301                          DEC     R1                      ;SIXTY SECONDS GONE BY
012276  001367                          BNE     2$                      ;NO, GO BACK
```

```

012300                                          PRINTB  #FRMT12                 ;DROPPING DRIVE
012300  012746  011305                          MOV     #FRMT12,-(SP)
012304  012746  000001                          MOV     #1,-(SP)
012310  010600                                  MOV     SP,R0
012312  104014                                  EMT     C$PNTB
012314  062706  000004                          ADD     #4,SP
012320  004737  010422                  6$:     JSR     PC,LINE1                ;GIVE DRIVE INFO
012324                                          DODU    UNITST                  ;TELL SUPERVISOR TO DROP IT
012324  013700  002132                          MOV     UNITST,R0
012330  104053                                  EMT     C$DODU
012332                                          DOCLN                           ;FORCE AN ABORT
012332  104044                                  EMT     C$DCLN


012334  012777  000013  167576          3$:     MOV     #13,@RLDA               ;SETUP DR RST
012342  012777  000204  167564                  MOV     #204,@RLCS              ;GS FUNC
012350  053777  002152  167556                  BIS     DRIVE,@RLCS             ;SELECT DRIVE
012356  042777  000200  167550                  BIC     #200,@RLCS              ;ISSUE IT
012364  032777  000200  167542          4$:     BIT     #200,@RLCS              ;WAIT FOR READY
012372  001774                                  BEQ     4$

012374                                  END:    SETVEC  BVEC,#INTSRV,#340
012374  012746  000340                          MOV     #340,-(SP)
012400  012746  013640                          MOV     #INTSRV,-(SP)
012404  013746  002150                          MOV     BVEC,-(SP)
012410  012746  000003                          MOV     #3,-(SP)
012414  104037                                  EMT     C$SVEC
012416  062706  000010                          ADD     #10,SP
012422  005037  002202                          CLR     PFLG            ;CLR PROCESSOR FLAG
012426                                          READBUS                 ;Q-BUS
012426  104007                                  EMT     C$RDBU
012430                                          BNCOMPLETE      1$
012430  103002                                  BCC     1$
012432  005237  002202                          INC     PFLG            ;NO, Q-BUS THEN
012436                                  1$:
012436                                          ENDINIT
012436                                  L10012:
012436  104011                                  EMT     C$INIT

012440                                          ENDMOD

012440                                  BGNMOD  CLNCODE

012440                                          BGNCLN

012440                                          SETPRI  #PRI07
012440  012700  000340                          MOV     #PRI07,R0
012444  104041                                  EMT     C$SPRI

012446  032777  000200  167460          1$:     BIT     #CRDY,@RLCS
012454  001774                                  BEQ     1$

012456  042777  000100  167450                  BIC     #INTEN,@RLCS

012464                                          CLRVEC  BVEC
012464  013700  002150                          MOV     BVEC,R0
```

```
        012470  104036                                  EMT     C$CVEC
    256
    257
    258
    259 012472  005737  002126                          TST     PWRFLG                          ;TREAT POWER FAILURE
    260 012476  001402                                  BEQ     2$
    261
    262 012500  005337  002126                          DEC     PWRFLG
    263
    264 012504                                  2$:
    265 012504                                          ENDCLN
        012504                                  L10013:
        012504  104012                                  EMT     C$CLEAN
    266
    267 012506                                          ENDMOD
    268
    269
    270
    271 012506                                  BGNMOD  DRPCODE
    272
    273 012506                                          BGNDU
    274
    275 012506  000240                                  NOP
    276
    277 012510                                          ENDDU
        012510                                  L10014:
        012510  104055                                  EMT     C$DU
    278
    279 012512                                  ENDMOD
    280
    281 012512                                  BGNMOD  ADDCODE
    282
    283 012512                                          BGNAU
    284
    285 012512  000240                                  NOP
    286
    287 012514                                          ENDAU
        012514                                  L10015:
        012514  104054                                  EMT     C$AU
    288
    289 012516                                  ENDMOD
    290
    291
    292                                         .SBTTL  GLOBAL SUBROUTINES
    293
    294 012516                                  BGNMOD  GLBSUB
    295
    296 012516                                  CKERLT: INLOOP
        012516  104020                                  EMT     C$INLP
    297 012520                                          BCOMPLETE       99$
        012520  103427                                  BCS     99$
    298 012522  005737  011436                          TST     DROP
    299 012526  001424                                  BEQ     99$
    300 012530  005277  170212                          INC     @ERPOINT
    301 012534  027737  170206  011440                  CMP     @ERPOINT,MERLMT
    302 012542  002416                                  BLT     99$
    303
```

```
 012544                                         PRINTF  #FRMT11
 012544  012746  011244                         MOV     #FRMT11,-(SP)
 012550  012746  000001                         MOV     #1,-(SP)
 012554  010600                                 MOV     SP,R0
 012556  104017                                 EMT     C$PNTF
 012560  062706  000004                         ADD     #4,SP
 012564  004737  010422                         JSR     PC,LINE1
 012570                                         DODU    UNITST          ;DROP THE UNIT
 012570  013700  002132                         MOV     UNITST,R0
 012574  104053                                 EMT     C$DODU
 012576                                         DOCLN
 012576  104044                                 EMT     C$DCLN
 012600                                 99$:
 012600  000205                                 RTS     R5



                                        .SBTTL  ROUTINE TO CHECK FOR CONTROLLER ERRORS

                                        ;****************************************************************
                                        ;*THIS ROUTINE WILL CHECK RLCS FOR ERRORS AND PRINT THEM
                                        ;*ACCORDINGLY.  IT WILL MERGE THE ERROR PRINTOUT WITH THE TEST
                                        ;*ERROR MESSAGE.
                                        ;*
                                        ;*EXAMPLE:   RLCS CONTAINED FOLLOWING ERROR(S):
                                        ;*                   DRV   OPI   HCRC   HNF
                                        ;*           SEEK UNDER INTERRUPT
                                        ;*
                                        ;*
                                        ;*
                                        ;*ROUTINE USES R0,R1 AND PICKS HEADER FROM R3
                                        ;*
                                        ;*      CALL    JSR     R5,CHERR
                                        ;*
                                        ;*
                                        ;*

 012602  005037  002164                 CHERR:  CLR     DERFLG          ;CLEAR OUT DRIVE ERROR FLAG
 012606  032737  176000  002166                 BIT     #176000,E.CS    ;ANY ERRORS SET
 012614  001001                                 BNE     199$            ;IF YES, INVESTIGATE
 012616  000205                                 RTS     R5              ;NO, EXIT
 012620  023727  002270  000004 199$:   CMP     TMPFNC,#GSTAT   ;FUNCTION-NOP, RESET, GETSTATUS
 012626  002401                                 BLT     98$             ;YES, GO CHECK IF ONLY DRIVE ERROR
 012630  000414                                 BR      1$              ;YES SERVICE ERROR
 012632  023727  002270  000002 98$:    CMP     TMPFNC,#WRCHK
 012640  001410                                 BEQ     1$
 012642  013700  002166                         MOV     E.CS,R0         ;GET E.CS
 012646  042700  001777                         BIC     #1777,R0        ;
 012652  022700  140000                         CMP     #140000,R0      ;DRIVE ERROR ALONE?
 012656  001001                                 BNE     1$              ;NO, GO SERVICE
 012660  000205                         2$:     RTS     R5              ;YES, EXIT

 012662  012701  007705                 1$:     MOV     #EM102,R1       ;GET START OF STRING
 012666  005737  002166                         TST     E.CS            ;IS COMPOSITE ERROR SET?(BETTER BE)
 012672  100003                                 BPL     99$             ;IT'S NOT SOMETHING IS WRONG
 012674  004537  013346                         JSR     R5,FIX          ;YES, PUT "COMP" IN STRING
 012700  003762                                 COMP                    ;"COMP"
```

```
012702  032737  040000  002166  99$:    BIT     #DERR,E.CS      ;DRIVE ERROR SET?
012710  001405                          BEQ     3$              ;NO, CONTINUE
012712  005237  002164                  INC     DERFLG          ;SET DRV ERROR FLAG
012716  004537  013346                  JSR     R5,FIX          ;YES, PUT "DRV" INTO STRING
012722  003711                          DEMES                   ;"DRV"
012724  032737  020000  002166  3$:     BIT     #NXM,E.CS       ;NON-EXISTENT MEMORY ERROR?
012732  001403                          BEQ     4$              ;NO, CONTINUE
012734  004537  013346                  JSR     R5,FIX          ;YES, PUT "NXM" INTO STRING
012740  003716                          NXMMES                  ;"NXM"
012742  032737  002000  002166  4$:     BIT     #OPI,E.CS       ;IS OPI SET?
012750  001422                          BEQ     6$              ;NO, GO CHECK BITS 11 & 12
012752  004537  013346                  JSR     R5,FIX          ;PUT "OPI" INTO STRING
012756  003723                          OPIMES                  ;"OPI"
012760  032737  004000  002166          BIT     #BIT11,E.CS     ;HEADERCRC ERROR?
012766  001403                          BEQ     5$              ;NO, GO CHECK HEADER NOT FOUND
012770  004537  013346                  JSR     R5,FIX          ;GO PUT "HCRC" IN STRING
012774  003730                          HCRCMES                 ;"HCRC"
012776  032737  010000  002166  5$:     BIT     #BIT12,E.CS     ;HEADER NOT FOUND?
013004  001422                          BEQ     8$              ;NO, GO PUT "CRLF" IN STRING
013006  004537  013346                  JSR     R5,FIX          ;PUT "HNF" IN STRING
013012  003736                          HNFMES                  ;"HNF"
013014  000416                          BR      8$              ;PUT "CRLF" IN STRING
013016  032737  004000  002166  6$:     BIT     #BIT11,E.CS     ;DATA CRC ERROR?
013024  001403                          BEQ     7$              ;NO, GO CHECK DATA LATE
013026  004537  013346                  JSR     R5,FIX          ;PUT "DCK" IN STRING
013032  003743                          DCKMES                  ;"DCK"
013034  032737  010000  002166  7$:     BIT     #BIT12,E.CS     ;DATA LATE ERROR?
013042  001403                          BEQ     8$              ;NO, GO PUT IN "CRLF"
013044  004537  013346                  JSR     R5,FIX          ;PUT "DLT" IN STRING
013050  003750                          DLTMES                  ;"DLT"
013052  004537  013346          8$:     JSR     R5,FIX
013056  003755                          MSCRLF
013060  004537  013346                  JSR     R5,FIX
013064  000000                  RESTMS: .WORD   0               ;HEADER FROM TEST
013066  105011                          CLRB    (R1)            ;PUT TERMINATOR IN

013070                                  ERRDF   300.,LF,ERR6
013070  104462                          TRAP    T$ERCODE
013072  000454                          .WORD   300
013074  003760                          .WORD   LF
013076  010322                          .WORD   ERR6

013100  000205                          RTS     R5              ;EXIT ROUTINE

                                .SBTTL LOAD RLCS
                                ;*****************************************************************
                                ;* ROUTINE TO LOAD RLCS WITH FUNCTION TO BE PERFORMED
                                ;*      CALL:   JSR     R5,LDFUNC
                                ;*              .WORD           ;BITS TO BE LOADED, FUNCTION
                                ;*                              ;AND INTR ENABLE ONLY
                                ;*
                                ;

013102  012537  002210          LDFUNC: MOV     (R5)+,LDCSR     ;GET BITS TO LOAD
013106  005737  002164                  TST     DERFLG
013112  001424                          BEQ     98$
013114  013746  002154                  MOV     B.CS,-(SP)
```

```
013120  012777  000013  167012          MOV     #13,@RLDA
013126  012737  000004  002154          MOV     #GSTAT,B.CS
013134  053737  002152  002154          BIS     DRIVE,B.CS
013142  013777  002154  166764          MOV     B.CS,@RLCS
013150  012637  002154                  MOV     (SP)+,B.CS
013154  032777  000200  166752  99$:    BIT     #200,@RLCS
013162  001774                          BEQ     99$
013164  010346                  98$:    MOV     R3,-(SP)          ;SAVE R3
013166  042737  177661  002210          BIC     #177661,LDCSR     ;CLEAR ALL BUT FUNC & INTR EN
013174  013737  002210  013320          MOV     LDCSR,FNDFNC      ;SAVE FUNCTION
013202  042737  000100  013320          BIC     #INTEN,FNDFNC     ;ONLY FUNCTION
013210  013737  013320  002270          MOV     FNDFNC,TMPFNC
013216  012703  013322                  MOV     #HDRLST,R3        ;GET HEADER LIST
013222  006237  013320                  ASR     FNDFNC            ;ALIGN TO RIGHT
013226  001404                          BEQ     2$
013230  022323                  1$:     CMP     (R3)+,(R3)+       ;BUMP R3 BY 4
013232  005337  013320                  DEC     FNDFNC            ;FOUND IT
013236  001374                          BNE     1$                ;NO,KEEP LOOKING
013240  032737  000100  002210  2$:     BIT     #INTEN,LDCSR      ;YES,DO WE WANT FLAG OR INTR
013246  001401                          BEQ     3$                ;FLAG BRANCH
013250  005723                          TST     (R3)+             ;INTR POINT TO THAT ONE
013252  011303                  3$:     MOV     (R3),R3           ;SET HEADER
013254  010337  013064                  MOV     R3,RESTMS         ;SET UP HEADER
013260  053737  002152  002210          BIS     DRIVE,LDCSR       ;SELECT DRIVE
013266  052737  000200  002210  4$:     BIS     #200,LDCSR        ;CONTROLLER READY
013274  013777  002210  166632          MOV     LDCSR,@RLCS
013302  004537  013360                  JSR     R5,BEFORE
013306  042777  000200  166620  5$:     BIC     #200,@RLCS
013314  012603                          MOV     (SP)+,R3          ;RESTORE R3
013316  000205                          RTS     R5                ;EXIT

013320  000000                  FNDFNC: .WORD   0

013322  004043                  HDRLST: NOPMES
013324  004074                          NOPINT
013326  004126                          WCKMES
013330  004166                          WCKINT
013332  004413                  OKHDR:  GSTMES
013334  004452                          GSTINT
013336  004330                          SEKMES
013340  004361                          SEKINT
013342  004227                          RHDMES
013344  004267                          RHDINT

                                ;*************************************************************
                                ;*ROUTINE TO MOVE ASCII STRINGS
                                ;*USES REGISTERS R1 - WHERE STRING IS BEING BUILT
                                ;*
                                ;*      CALL    JSR     R5,FIX
                                ;*              .WORD             ;ADDRESS OF STRING TO MOVE

013346  012500                  FIX:    MOV     (R5)+,R0          ;GET ADDRESS AND MOVE RETURN
013350  112021                  1$:     MOVB    (R0)+,(R1)+       ;GET BYTE AND UPDATE
013352  001376                          BNE     1$                ;WATCH 0 BYTE TERMINATOR
013354  105741                          TSTB    -(R1)             ;BACK UP OVER ZERO BYTE
013356  000205                          RTS     R5                ;EXIT

```

```

                                        ;LOAD REGISTERS BEFORE FUNCTION
                                        ;CALL:  JSR     R5,BEFORE

013360  017737  166550  002154          BEFORE: MOV     @RLCS,B.CS      ;READ CS
013366  017737  166544  002156                  MOV     @RLBA,B.BA      ;READ BA
013374  017737  166540  002160                  MOV     @RLDA,B.DA      ;READ DA
013402  017737  166534  002162                  MOV     @RLMP,B.MP      ;READ MP
013410  000205                                  RTS     R5


                                        ;LOAD REGISTERS AT ERROR
                                        ;CALL:  JSR     R5,AFTER

013412  017737  166516  002166          AFTER:  MOV     @RLCS,E.CS      ;READ CS
013420  017737  166512  002170                  MOV     @RLBA,E.BA      ;READ BA
013426  017737  166506  002172                  MOV     @RLDA,E.DA      ;READ DA
013434  017737  166502  002174                  MOV     @RLMP,E.MP      ;READ MP
013442  017737  166474  002176                  MOV     @RLMP,E.MP1     ;READ MP
013450  017737  166466  002200                  MOV     @RLMP,E.MP2     ;READ MP
013456  000205                                  RTS     R5



                                        .SBTTL  ROUTINE TO CALCULATE CRC

                                        ;ROUTINE WILL CALCULATE A CRC-16 CRC ON A WORD OF
                                        ;1-16 BITS IN LENGTH, RESULT IS RETURNED IN "CALBCC"
                                        ;
                                        ;       CALL:   JSR     R5,SIMBCC
                                        ;               .WORD           ;NUMBER OF BITS (1-16)
                                        ;               .WORD           ;DATA FOR CRC CALCULATION
                                        ;               .WORD           ;PREVIOUS OR STARTING CRC
                                        ;                               (SHOULD BE ZEROED FOR START)
                                        ;       ROUTINE USES R0,R1,R2

013460  010046                          SIMBCC: MOV     R0,-(SP)        ;SAVE R0
013462  010146                                  MOV     R1,-(SP)        ;SAVE R1
013464  010246                                  MOV     R2,-(SP)        ;SAVE R2
013466  012537  002224                          MOV     (R5)+,TEMP2     ;GET NUMBER OF BITS
013472  012537  002226                          MOV     (R5)+,TEMP3     ;GET DATA FOR CRC CALCULATION
013476  012537  002230                          MOV     (R5)+,TEMP4     ;GET STARTING CRC
013502  005037  002220                  1$:     CLR     BCCFBK          ;
013506  013700  002230                          MOV     TEMP4,R0        ;GET PRESENT CRC
013512  006037  002226                          ROR     TEMP3           ;ROTATE NEW DATA
013516  005500                                  ADC     R0              ;MERGE NEW WITH OLD
013520  032700  000001                          BIT     #1,R0           ;BIT 0 SET
013524  001402                                  BEQ     2$              ;IF NOT CONTINUE
013526  005137  002220                          COM     BCCFBK          ;
013532  013700  002214                  2$:     MOV     XPOLY,R0        ;GET CRC POLYNOMIAL (CRC-16)
013536  005100                                  COM     R0              ;COMPLIMENT POLYNOMIAL
013540  040037  002220                          BIC     R0,BCCFBK
013544  000241                                  CLC                     ;CLEAR CARRY
013546  006037  002230                          ROR     TEMP4
013552  013700  002220                          MOV     BCCFBK,R0
013556  013701  002230                          MOV     TEMP4,R1
013562  010102                                  MOV     R1,R2
```

```
    520 013564  040100                          BIC     R1,R0
    521 013566  043702  002220                  BIC     BCCFBK,R2
    522 013572  050200                          BIS     R2,R0
    523 013574  043737  002214  002230          BIC     XPOLY,TEMP4
    524 013602  050037  002230                  BIS     R0,TEMP4
    525 013606  005337  002224                  DEC     TEMP2
    526 013612  001333                          BNE     1$
    527 013614  013737  002230  002222          MOV     TEMP4,CALBCC
    528 013622  012602                          MOV     (SP)+,R2
    529 013624  012601                          MOV     (SP)+,R1
    530 013626  012600                          MOV     (SP)+,R0
    531 013630  000205                          RTS     R5              ;RETURN
    532
    533
    534
    535                                 ;ROUTINE TO SET FLAG IF TRAP OCCURRED
    536                                 ;"TRPHAN" IS IN LOCATION 4.
    537
    538
    539 013632  005237  002204          TRPHAN: INC     TRPFLG          ;INDICATE TRAP
    540 013636  000002                          RTI                     ;RETURN
    541
    542 013640                          BGNSRV
    543
    544 013640  005237  002206          INTSRV: INC     INTFLG          ;INDICATE INTERRUPT
    545
    546 013644                          ENDSRV
        013644                          L10016:
        013644  000002                          RTI
    547
    548                                 ;ROUTINE TO WAIT FOR DRIVE READY
    549 013646  010146                  WTDRDY: MOV     R1,-(SP)        ;SAVE R1
    550 013650  012701  003720                  MOV     #2000.,R1       ;TIME OUT OF 200 MILLISECONDS
    551 013654  032777  000001  166252  1$:     BIT     #DRDY,@RLCS     ;DRIVE READY?
    552 013662  001011                          BNE     2$              ;YES, EXIT
    553
    554 013664                                  WAITUS  #1              ;WAIT A WHILE
        013664  012700  000001                  MOV     #1,R0
        013670  104027                          EMT     C$WTU
    555 013672  005301                          DEC     R1              ;CHECK IF TIME UP
    556 013674  001367                          BNE     1$              ;NO, GO CHECK DRIVE READY
    557
    558 013676                                  EPRDF   200.,DRTIM,ERR5 ;DRIVE READY DID NOT SET
        013676  104462                          TRAP    T$ERCODE
        013700  000310                          .WORD   200
        013702  004627                          .WORD   DRTIM
        013704  010310                          .WORD   ERR5
    559
    560 013706  012601                  2$:     MOV     (SP)+,R1        ;RESTORE
    561 013710  000205                          RTS     R5              ;EXIT
    562
    563                                 ;ROUTINE TO WAIT FOR CONTROLLER READY
    564 013712  010146                  WTCRDY: MOV     R1,-(SP)        ;SAVE R1
    565 013714  012701  017500                  MOV     #8000.,R1       ;WAIT 800 MILLISECONDS
    566 013720  032777  000200  166206  1$:     BIT     #CRDY,@RLCS     ;CONTROLLER READY
    567 013726  001014                          BNE     2$              ;YES, EXIT
    568 013730                                  WAITUS  #1              ;WAIT A WHILE
```

```
 013730  012700  000001                 MOV     #1,R0
 013734  104027                         EMT     C$WTU
 013736  005301                         DEC     R1              ;CHECK IF TIME UP
 013740  001367                         BNE     1$              ;NO GO BACK

 013742  004537  013412                 JSR     R5,AFTER        ;GET REGISTERS

 013746                                 ERRDF   100.,CRTIM,ERR6 ;CONTROLLER TIMED OUT
 013746  104462                         TRAP    T$ERCODE
 013750  000144                         .WORD   100
 013752  004602                         .WORD   CRTIM
 013754  010322                         .WORD   ERR6

 013756  000402                         BR      3$              ;EXIT

 013760  004537  013412         2$:     JSR     R5,AFTER        ;GET REGISTERS
 013764  012601                 3$:     MOV     (SP)+,R1
 013766  000205                         RTS     R5              ;EXIT



 013770                                 ENDMOD




                                .SBTTL  **TEST 1** - RLCS ADDRESSABILITY

 013770                         BGNTST                          ;****START OF TEST****
 013770                         STARS
                                ;;**************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE CONTROL
                                ;AND STATUS REGISTER.  IF WE TRAP WE WILL REPORT
                                ;THE ERROR AND ABORT.  AFTER THIS TEST WE ONLY KNOW
                                ;THAT WE CAN ADDRESS THE REGISTER.
 013770                         STARS
                                ;;**************************************************************


 013770  005037  002204         1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
 013774                         2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
 013774  012746  000340                 MOV     #340,-(SP)
 014000  012746  013632                 MOV     #TRPHAN,-(SP)
 014004  013746  002216                 MOV     ERRVEC,-(SP)
 014010  012746  000003                 MOV     #3,-(SP)
 014014  104037                         EMT     C$SVEC
 014016  062706  000010                 ADD     #10,SP

 014022  005777  166106                 TST     @RLCS           ;ADDRESS RLCS
 014026                                 CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
 014026  013700  002216                 MOV     ERRVEC,R0
 014032  104036                         EMT     C$CVEC
 014034  005737  002204                 TST     TRPFLG          ;TRAP OCCURRED???
 014040  001407                         BEQ     3$              ;NO, IKAY PROCEED
 014042  013737  002134  002240         MOV     RLCS,GDDAT      ;SET UP ERROR DATA

 014050                                 ERRSF   0.,EM1,ERR1     ;BUS TIMEOUT IN ADDRESSING RLCS
 014050  104461                         TRAP    T$ERCODE
```

```
014052  000000                          .WORD   0
014054  004655                          .WORD   EM1
014056  010114                          .WORD   ERR1
014060                          3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
014060  104006                          EMT     C$CLP1
014062                          ENDTST                          ;****END OF TEST****
014062                          L10017:
014062  104001                          EMT     C$ETST


                                .SBTTL  **TEST 2** - RLBA ADDRESSABILITY

014064                          BGNTST                          ;****START OF TEST****


014064                          STARS
                                ;;************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE BUS ADDRESS
                                ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR
                                ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
                                ;WE CAN ADDRESS THE REGISTER.
014064                          STARS
                                ;;************************************************************

014064  005037  002204          1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
014070                          2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
014070  012746  000340                  MOV     #340,-(SP)
014074  012746  013632                  MOV     #TRPHAN,-(SP)
014100  013746  002216                  MOV     ERRVEC,-(SP)
014104  012746  000003                  MOV     #3,-(SP)
014110  104037                          EMT     C$SVEC
014112  062706  000010                  ADD     #10,SP

014116  005777  166014                  TST     @RLBA           ;ADDRESS RLBA
014122                                  CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
014122  013700  002216                  MOV     ERRVEC,R0
014126  104036                          EMT     C$CVEC
014130  005737  002204                  TST     TRPFLG          ;TRAP OCCURRED???
014134  001407                          BEQ     3$              ;NO, CONTINUE
014136  013737  002136  002240          MOV     RLBA,GDDAT      ;SETUP ERROR DATA

014144                                  ERRSF   1.,EM2,ERR1     ;BUS TIMEOUT IN ADDRESSING RLBA
014144  104461                          TRAP    T$ERCODE
014146  000001                          .WORD   1
014150  004702                          .WORD   EM2
014152  010114                          .WORD   ERR1
014154                          3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
014154  104006                          EMT     C$CLP1
014156                          ENDTST                          ;****END OF TEST****
014156                          L10020:
014156  104001                          EMT     C$ETST


                                .SBTTL  **TEST 3** - RLDA ADDRESSABILITY

014160                          BGNTST                          ;****START OF TEST****
014160                          STARS
```

```
                                ;;*************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE DISK ADDRESS
                                ;REGISTER IF WE TRAP WE WILL REPORT THE ERROR
                                ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
                                ;WE CAN ADDRESS THE REGISTER.
014160                          STARS
                                ;;*************************************************************


014160  005037  002204          1$:     CLR     TRPFLG            ;CLEAR TRAP OCCURANCE
014164                          2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
014164  012746  000340                  MOV     #340,-(SP)
014170  012746  013632                  MOV     #TRPHAN,-(SP)
014174  013746  002216                  MOV     ERRVEC,-(SP)
014200  012746  000003                  MOV     #3,-(SP)
014204  104037                          EMT     C$SVEC
014206  062706  000010                  ADD     #10,SP

014212  005777  165722                  TST     @RLDA             ;ADDRESS RLDA
014216                                  CLRVEC  ERRVEC            ;RELEASE TRAP VECTOR
014216  013700  002216                  MOV     ERRVEC,R0
014222  104036                          EMT     C$CVEC
014224  005737  002204                  TST     TRPFLG            ;TRAP OCCURRED???
014230  001407                          BEQ     3$                ;NO, CONTINUE

014232  013737  002140  002240          MOV     RLDA,GDDAT        ;SETUP ERROR INFO
014240                                  ERRSF   2.,EM3,ERR1       ;BUS TIMEOUT IN ADDRESSING RLDA
014240  104461                          TRAP    T$ERCODE
014242  000002                          .WORD   2
014244  004727                          .WORD   EM3
014246  010114                          .WORD   ERR1
014250                          3$:     CKLOOP                    ;CHECK IF /FL:LOE IS SET
014250  104006                          EMT     C$CLP1
014252                          ENDTST                            ;****END OF TEST****
014252                          L10021:
014252  104001                          EMT     C$ETST



                                .SBTTL  **TEST 4** - RLMP ADDRESSABILITY

014254                          BGNTST                            ;****START OF TEST****
014254                          STARS
                                ;;*************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE MULTIPURPOSE
                                ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR AND
                                ;ABORT.  AFTER THIS TEST WE ONLY KNOW THAT WE CAN
                                ;ADDRESS THE REGISTER.
014254                          STARS
                                ;;*************************************************************


014254  005037  002204          1$:     CLR     TRPFLG            ;CLEAR TRAP OCCURANCE
014260                          2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET UP TO CATCH TRAP
014260  012746  000340                  MOV     #340,-(SP)
014264  012746  013632                  MOV     #TRPHAN,-(SP)
014270  013746  002216                  MOV     ERRVEC,-(SP)
014274  012746  000003                  MOV     #3,-(SP)
```

```
014300  104037                                  EMT     C$SVEC
014302  062706  000010                          ADD     #10,SP

014306  005777  165630                          TST     @RLMP           ;ADDRESS RLMP
014312                                          CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
014312  013700  002216                          MOV     ERRVEC,R0
014316  104036                                  EMT     C$CVEC
014320  005737  002204                          TST     TRPFLG          ;TRAP OCCURRED???
014324  001407                                  BEQ     3$              ;NO, CONTINUE
014326  013737  002142  002240                  MOV     RLMP,GDDAT      ;SET UP ERROR INFO

014334                                          ERRSF   3.,EM4,ERR1     ;BUS TIMEOUT IN ADDRESSING RLMP
014334  104461                                  TRAP    T$ERCODE
014336  000003                                  .WORD   3
014340  004754                                  .WORD   EM4
014342  010114                                  .WORD   ERR1
014344                                  3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
014344  104006                                  EMT     C$CLP1
014346                                  ENDTST                          ;****END OF TEST****
014346                                  L10022:
014346  104001                                  EMT     C$ETST



                                        .SBTTL  **TEST 5** - READ WRITE OF RLCS

014350                                  BGNTST                          ;****START OF TEST****



014350                                  STARS
                                        ;;***************************************************************
                                        ;TEST THAT WE CAN WRITE/READ BITS 8,9 AND BITS 6-1
                                        ;OF THE CONTROL AND STATUS REGISTER.  BITS 15-10 AND 0
                                        ;ARE DON'T CARE BITS AT THIS TIME AND BIT 7
                                        ;(CONTROLLER READY) IS ALWAYS WRITTEN TO A ONE.
014350                                  STARS
                                        ;;***************************************************************


014350  012703  002646                          MOV     #CSPAT,R3       ;SET UP TABLE POINTER OF PATTERNS

014354                                  BGNSEG                          ;****START OF SEGMENT****
014354  104004                                  EMT     C$BSEG

014356                                  CSTEST:
014356  011337  002240                          MOV     (R3),GDDAT      ;GET PATTERN INTO GDDAT
014362  052737  000200  002240                  BIS     #200,GDDAT      ;INSURE GO IS SET
014370  013777  002240  165536                  MOV     GDDAT,@RLCS     ;LOAD RLCS (CONTROL AND STATUS)
014376  032777  040000  165530                  BIT     #DERR,@RLCS     ;IF DRIVE ERROR PRESENT
014404  001403                                  BEQ     99$             ;THEN EXPECT DRIVE AND
014406  052737  140000  002240                  BIS     #ERR!DERR,GDDAT ;COMPOSITE ERROR
014414  017737  165514  002242          99$:    MOV     @RLCS,BDDAT     ;READ RLCS BACK
014422  042737  000001  002242                  BIC     #DRDY,BDDAT     ;IGNORE DRIVE READY
014430  023737  002240  002242                  CMP     GDDAT,BDDAT     ;DID WE READ WHAT WE LOADED
014436  001404                                  BEQ     1$              ;YES, THEN BRANCH

014440                                          ERRDF   4.,EM5,ERR2     ;WRONG DATA IN RLCS
```

```
014440  104462                          TRAP    T$ERCODE
014442  000004                          .WORD   4
014444  005001                          .WORD   EM5
014446  010126                          .WORD   ERR2
014450                          1$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
014450  104010                          EMT     C$ESCAPE
014452  000012                          .WORD   10000$-.


014454  005723                          TST     (R3)+           ;BUMP FOR NEXT PATTERN
014456  020327  002744                  CMP     R3,#CSEND       ;CHECK FOR END
014462  001335                          BNE     CSTEST          ;NOT END, LOAD NEXT PATTERN

014464                          ENDSEG                          ;****END OF SEGMENT****
014464                          10000$:
014464  104005                          EMT     C$ESEG
014466                          ENDTST                          ;****END OF TEST****
014466                          L10023:
014466  104001                          EMT     C$ETST


                                .SBTTL  **TEST 6** - READ WRITE OF RLBA

014470                          BGNTST                          ;****START OF TEST****

014470                          STARS
                                ;;*****************************************************************
                                ;TEST THAT WE CAN WRITE/READ BITS IS THRU 1 OF THE
                                ;BUS ADDRESS REGISTER.  FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
                                ;GROWING 0 AND SHIFTING 0.  BIT 0 IS ALSO LOADED BUT
                                ;SHOULD ALWAYS COME BACK AS 0
014470                          STARS
                                ;;*****************************************************************


014470  012703  002272                  MOV     #BEGPAT,R3      ;GET START OF PATTERN LIST
014474                          BGNSEG                          ;****START OF SEGMENT****
014474  104004                          EMT     C$BSEG
014476                          BATEST:
014476  011337  002240                  MOV     (R3),GDDAT      ;GET PATTERN TO SEND
014502  005737  002266                  TST     T.CNTLR         ;RL11??
014506  001403                          BEQ     2$              ;NO,
014510  042737  000001  002240          BIC     #BIT0,GDDAT     ;KEEP RLBA EVEN (UNIBUS)
014516  013777  002240  165412  2$:     MOV     GDDAT,@RLBA     ;LOAD PATTERN TO BUS ADDRESS
014524  017737  165406  002242          MOV     @RLBA,BDDAT     ;READ IT BACK
014532  023737  002240  002242          CMP     GDDAT,BDDAT     ;IS IT CORRECT?
014540  001404                          BEQ     1$              ;IF SO, BRANCH

014542                                  ERRDF   5.,EM6,ERR2     ;DATA WRONG IN RLBA
014542  104462                          TRAP    T$ERCODE
014544  000005                          .WORD   5
014546  005052                          .WORD   EM6
014550  010126                          .WORD   ERR2
014552                          1$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
014552  104010                          EMT     C$ESCAPE
014554  000012                          .WORD   10000$-.
```

```


014556  005723                                  TST     (R3)+           ;BUMP FOR NEXT PATTERN
014560  020327  002500                          CMP     R3,#ENDPAT      ;CHECK FOR END
014564  001344                                  BNE     BATEST          ;NOT END, BRANCH FOR NEXT

014566                                  ENDSEG                          ;****END OF SEGMENT****
014566                                  10000$:
014566  104005                                  EMT     C$ESEG
014570                                  ENDTST                          ;****END OF TEST****
014570                                  L10024:
014570  104001                                  EMT     C$ETST



                                        .SB'TL  **TEST 7** - READ WRITE OF RLDA

014572                                  BGNTST                          ;****START OF TEST****

014572                                  STARS
                                        ;;*************************************************************
                                        ;TEST THAT WE CAN WRITE/READ THE DISK ADDRESS REGISTER
                                        ;ALL BIT POSITIONS ARE WRITTEN USING FOUR PATTERNS:
                                        ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
014572                                  STARS
                                        ;;*************************************************************


014572  012703  002272                          MOV     #BEGPAT,R3      ;SET UP POINTER TO PATTERN LIST
014576                                  BGNSEG                          ;****START OF SEGMENT****
014576  104004                                  EMT     C$BSEG
014600                                  DATEST:
014600  011337  002240                          MOV     (R3),GDDAT      ;GET PATTERN
014604  013777  002240  165326                  MOV     GDDAT,@RLDA     ;LOAD PATTERN IN DA

014612  017737  165322  002242                  MOV     @RLDA,BDDAT     ;READ PATTERN BACK
014620  023737  002240  002242                  CMP     GDDAT,BDDAT     ;IS IT CORRECT?
014626  001404                                  BEQ     1$              ;BRANCH IF CORRECT

014630                                          ERRDF   6.,EM7,ERR2     ;WRONG DATA IN RLDA
014630  104462                                  TRAP    T$ERCODE
014632  000006                                  .WORD   6
014634  005100                                  .WORD   EM7
014636  010126                                  .WORD   ERR2
014640                                  1$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
014640  104010                                  EMT     C$ESCAPE
014642  000012                                  .WORD   10000$-.


014644  005723                                  TST     (R3)+           ;BUMP POINTER
014646  020327  002500                          CMP     R3,#ENDPAT      ;AT END OF PATTERNS?
014652  001352                                  BNE     DATEST          ;NO, BRANCH BACK

014654                                  ENDSEG                          ;****END OF SEGMENT****
014654                                  10000$:
014654  104005                                  EMT     C$ESEG
014656                                  ENDTST                          ;****END OF TEST****
014656                                  L10025:
     014656  104001                           EMT     C$ETST


                                      .SBTTL  **TEST 8** - BIS OF RLCS

     014660                           BGNTST                          ;****START OF TEST****
     014660                           STARS
                                      ;;****************************************************************
                                      ;TEST THAT WE CAN USE THE "BIS" INSTRUCTION ON THE CONTROL
                                      ;AND STATUS REGISTER.  BITS 8,9 AND 6-1 ARE TESTED TO
                                      ;SET INDIVIDUALLY AS WELL AS COLLECTIVELY WITHOUT DESTROYING
                                      ;ANY PREVIOUS DATA PATTERN
     014660                           STARS
                                      ;;****************************************************************


     014660  012703  002646                   MOV     #CSPAT,R3       ;GET BEGINNING OF LIST
     014664                           BGNSEG                          ;****START OF SEGMENT****
     014664  104004                           EMT     C$BSEG
     014666                           1$:
     014666  012777  000200  165240           MOV     #CRDY,@RLCS     ;INSURE GO IS THERE
     014674  011337  002240                   MOV     (R3),GDDAT      ;SET UP EXPECTED RLCS
     014700  052737  000200  002240           BIS     #CRDY,GDDAT     ;IN GDDAT
     014706  051377  165222                   BIS     (R3),@RLCS      ;BIT SET PATTERN IN RLCS
     014712  032777  040000  165214           BIT     #DERR,@RLCS     ;IF ERROR BIT SET THEN
     014720  001403                           BEQ     99$             ;EXPECT IT ON THE READ
     014722  052737  140000  002240           BIS     #ERR!DERR,GDDAT ;BACK
     014730  017737  165200  002242   99$:    MOV     @RLCS,BDDAT     ;READ RLCS TO CHECK "BIS"
     014736  042737  000001  002242           BIC     #DRDY,BDDAT     ;CLEAR OUT DRIVE READY
     014744  023737  002242  002240           CMP     BDDAT,GDDAT     ;DID BIS WORK?
     014752  001404                           BEQ     2$              ;BRANCH IF OKAY

     014754                                   ERRDF   7.,EM61,ERR2    ;WRONG DATA IN RLCS
     014754  104462                           TRAP    T$ERCODE
     014756  000007                           .WORD   7
     014760  006575                           .WORD   EM61
     014762  010126                           .WORD   ERR2
     014764                           2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
     014764  104010                           EMT     C$ESCAPE
     014766  000012                           .WORD   10000$-.
                                                                      ;BIT OR CLEARED OTHER BIT

     014770  005723                           TST     (R3)+           ;GET NEXT PATTERN
     014772  022703  002744                   CMP     #CSEND,R3       ;AT END OF LIST
     014776  001333                           BNE     1$              ;NO GO BACK FOR TEST OF
                                                                      ;NEXT PATTERN
     015000                           ENDSEG                          ;****END OF SEGMENT****
     015000                           10000$:
     015000  104005                           EMT     C$ESEG
     015002                           ENDTST                          ;****END OF TEST****
     015002                           L10026:
     015002  104001                           EMT     C$ETST


                                      .SBTTL  **TEST 9** - BIC OF RLCS

     015004                           BGNTST                          ;****START OF TEST****
```

```

015004                          STARS
                                ;;***************************************************************
                                ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE
                                ;CONTROL AND STATUS REGISTER.  BITS 8-9 AND 6-1 ARE
                                ;TESTED.
015004                          STARS
                                ;;***************************************************************


015004  012703  002646                  MOV     #CSPAT,R3       ;GET BEGINNING OF PATTERNS
015010                          BGNSEG                          ;****START OF SEGMENT****
015010  104004                          EMT     C$BSEG
015012                          1$:
015012  012777  001776  165114          MOV     #1776,@RLCS     ;SET ALL SETTABLE BITS
015020  012737  001776  002240          MOV     #1776,GDDAT     ;SET UP EXPECT DATA IN
015026  041337  002240                  BIC     (R3),GDDAT      ;GDDAT
015032  041377  165076                  BIC     (R3),@RLCS      ;CLEAR BITS IN RLCS VIA "BIC"
015036  032777  040000  165070          BIT     #DERR,@RLCS     ;IF DRIVE ERROR BIT SET
015044  001403                          BEQ     99$             ;EXPECT IT SET WHEN WE
015046  052737  140000  002240          BIS     #ERR!DERR,GDDAT ;READ IT BACK
015054  017737  165054  002242  99$:    MOV     @RLCS,BDDAT     ;MOVE RLCS TO BDDAT FOR COMPARE
015062  042737  000001  002242          BIC     #DRDY,BDDAT     ;CLEAR DRIVE READY
015070  023737  002242  002240          CMP     BDDAT,GDDAT     ;DID "BIC" WORK PROPERLY
015076  001404                          BEQ     2$              ;BRANCH IF OKAY

015100                                  ERRDF   8.,EM62,ERR2    ;WRONG DATA IN RLCS
015100  104462                          TRAP    T$ERCODE
015102  000010                          .WORD   8
015104  006656                          .WORD   EM62
015106  010126                          .WORD   ERR2
015110                          2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
015110  104010                          EMT     C$ESCAPE
015112  000012                          .WORD   10000$-.

015114  005723                          TST     (R3)+           ;GET NEXT PATTERN
015116  020327  002744                  CMP     R3,#CSEND       ;AT END OF LIST
015122  001333                          BNE     1$              ;NO, GO BACK WITH NEXT PATTERN
015124                          ENDSEG                          ;****END OF SEGMENT****
015124                          10000$:
015124  104005                          EMT     C$ESEG
015126                          ENDTST                          ;****END OF TEST****
015126                          L10027:
015126  104001                          EMT     C$ETST



                                .SBTTL  **TEST 10** - BIS OF RLBA

015130                          BGNTST                          ;****START OF TEST****

015130                          STARS
                                ;;***************************************************************
                                ;TEST THAT THE "BIS" INSTRUCTION WILL WORK ON THE BUS
                                ;ADDRESS REGISTER.  BITS 15-0 ARE LOADED, ONLY BITS 15-1
                                ;ARE EXPECTED BACK.  FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
                                ;GROWING 0, AND SHIFTING 0.
015130                          STARS
```

```
                                ;;***************************************************************


015130  012703  002272                  MOV     #BEGPAT,R3      ;GET START OF LIST
015134                          BGNSEG                          ;****START OF SEGMENT****
015134  104004                          EMT     C$BSEG
015136                          1$:
015136  005077  164774                  CLR     @RLBA           ;CLEAR "BA"
015142  011337  002240                  MOV     (R3),GDDAT      ;SET EXPECTED
015146  005737  002266                  TST     T.CNTLR         ;RL11
015152  001403                          BEQ     3$              ;NO
015154  042737  000001  002240          BIC     #1,GDDAT        ;BIT 0 CAN'T SET IN RLBA (UNIBUS)
015162  051377  164750          3$:     BIS     (R3),@RLBA      ;BIS RLBA WITH PATTERN
015166  017737  164744  002242          MOV     @RLBA,BDDAT     ;READ "BA"
015174  023737  002242  002240          CMP     BDDAT,GDDAT     ;DID RLBA LOAD PROPERLY?
015202  001404                          BEQ     2$              ;BRANCH IF YES

015204                                  ERRDF   9.,EM63,ERR2    ;WRONG DATA IN RLBA
015204  104462                          TRAP    T$ERCODE
015206  000011                          .WORD   9
015210  006741                          .WORD   EM63
015212  010126                          .WORD   ERR2
015214                          2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
015214  104010                          EMT     C$ESCAPE
015216  000012                          .WORD   10000$-.

015220  005723                          TST     (R3)+           ;GET NEXT PATTERN
015222  020327  002500                  CMP     R3,#ENDPAT      ;DID WE COMPLETE LIST
015226  001343                          BNE     1$              ;NO, GO BACK FOR NEXT.
015230                          ENDSEG                          ;****END OF SEGMENT****
015230                          10000$:
015230  104005                          EMT     C$ESEG
015232                          ENDTST                          ;****END OF TEST****
015232                          L10030:
015232  104001                          EMT     C$ETST


                                .SBTTL  **TEST 11** - BIC OF RLBA

015234                          BGNTST                          ;****START OF TEST****

015234                          STARS
                                ;;***************************************************************
                                ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE BUS
                                ;ADDRESS REGISTER.  BITS 15-1 ARE TESTED WITH 4 PATTERNS
                                ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0.
015234                          STARS
                                ;;***************************************************************


015234  012703  002272                  MOV     #BEGPAT,R3      ;GET START OF LIST
015240                          BGNSEG                          ;****START OF SEGMENT****
015240  104004                          EMT     C$BSEG
015242                          1$:
015242  012777  177776  164666          MOV     #-2,@RLBA       ;SET RLBA TO ALL 1'S (BIT 0=0)
015250  012737  177776  002240          MOV     #-2,GDDAT       ;SET UP EXPECTED RESULTS
015256  041337  002240                  BIC     (R3),GDDAT      ;IN GDDAT
```

```
    170 015262  041377  164650                    BIC     (R3),@RLBA      ;BIC RLBA
    171 015266  017737  164644  002242            MOV     @RLBA,BDDAT     ;READ RLBA
    172 015274  023737  002242  002240            CMP     BDDAT,GDDAT     ;BIC WORK OKAY?
    173 015302  001404                            BEQ     2$              ;IF YES BRANCH
    174
    175 015304                                    ERRDF   10.,EM64,ERR2   ;WRONG DATA IN RLBA
        015304  104462                            TRAP    T$ERCODE
        015306  000012                            .WORD   10
        015310  007022                            .WORD   EM64
        015312  010126                            .WORD   ERR2
    176 015314                            2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
        015314  104010                            EMT     C$ESCAPE
        015316  000012                            .WORD   10000$-.
    177
    178 015320  005723                            TST     (R3)+           ;GET NEXT PATTERN
    179 015322  020327  002500                    CMP     R3,#ENDPAT      ;HAVE WE COMPLETED LIST
    180 015326  001345                            BNE     1$              ;NO, GO BACK FOR NEXT
    181 015330                            ENDSEG                          ;****END OF SEGMENT****
        015330                            10000$:
        015330  104005                            EMT     C$ESEG
    182 015332                            ENDTST                          ;****END OF TEST****
        015332                            L10031:
        015332  104001                            EMT     C$ETST
    183
    184
    185                                   .SBTTL  **TEST 12** - BIS OF RLDA
    186
    187 015334                            BGNTST                          ;****START OF TEST****
    188
    189 015334                            STARS
                                          ;;****************************************************************
    190                                   ;TEST THAT THE "BIS" INSTRUCTION WILL WORK ON THE DISK ADDRESS
    191                                   ;REGISTER.  BITS 15-0 ARE TESTED WITH 4 PATTERNS, GROWING 1,
    192                                   ;SHIFTING 1, GROWING 0, AND SHIFTING 0.
    193 015334                            STARS
                                          ;;****************************************************************
    194
    195
    196 015334  012703  002272                    MOV     #BEGPAT,R3      ;GET START OF LIST
    197 015340                            BGNSEG                          ;****START OF SEGMENT****
        015340  104004                            EMT     C$BSEG
    198 015342                            1$:
    199 015342  005077  164572                    CLR     @RLDA           ;CLEAR "DA"
    200 015346  011337  002240                    MOV     (R3),GDDAT      ;SET EXPECTED
    201 015352  051377  164562                    BIS     (R3),@RLDA      ;BIS RLDA
    202 015356  017737  164556  002242            MOV     @RLDA,BDDAT     ;READ RLDA
    203 015364  023737  002242  002240            CMP     BDDAT,GDDAT     ;IS RLDA CORRECT
    204 015372  001404                            BEQ     2$              ;IF OKAY BRANCH
    205
    206 015374                                    ERRDF   11.,EM65,ERR2   ;WRONG DATA IN RLDA
        015374  104462                            TRAP    T$ERCODE
        015376  000013                            .WORD   11
        015400  007105                            .WORD   EM65
        015402  010126                            .WORD   ERR2
    207 015404                            2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
        015404  104010                            EMT     C$ESCAPE
        015406  000012                            .WORD   10000$-.
```

```

015410  005723                              TST     (R3)+           ;GET NEXT PATTERN
015412  020327  002500                      CMP     R3,#ENDPAT      ;HAVE WE FINISHED?
015416  001351                              BNE     1$              ;NO GO BACK
015420                              ENDSEG                          ;****END OF SEGMENT****
015420                              10000$:
015420  104005                              EMT     C$ESEG
015422                              ENDTST                          ;****END OF TEST****
015422                              L10032:
015422  104001                              EMT     C$ETST



                                    .SBTTL  **TEST 13** - BIC OF RLDA

015424                              BGNTST                          ;****START OF TEST****

015424                              STARS
                                    ;;*************************************************************
                                    ;TEST THAT THE "BIC" INSTRUCTION WORKS ON THE DISK
                                    ;ADDRESS REGISTER.  ALL BITS ARE TESTED WITH FOUR
                                    ;PATTERNS: GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
015424                              STARS
                                    ;;*************************************************************


015424  012703  002272                      MOV     #BEGPAT,R3      ;GET START OF LIST
015430                              BGNSEG                          ;****START OF SEGMENT****
015430  104004                              EMT     C$BSEG
015432                              1$:
015432  012777  177777  164500              MOV     #-1,@RLDA       ;SET RLDA TO ALL 1'S
015440  012737  177777  002240              MOV     #-1,GDDAT       ;SET EXPECTED DATA
015446  041337  002240                      BIC     (R3),GDDAT      ;SET EXPECTED DATA
015452  041377  164462                      BIC     (R3),@RLDA      ;"BIC" RLDA
015456  017737  164456  002242              MOV     @RLDA,BDDAT     ;READ RLDA
015464  023737  002240  002242              CMP     GDDAT,BDDAT     ;DID "BIC" WORK?
015472  001404                              BEQ     2$              ;IF IT DID BRANCH

015474                                      ERRDF   12.,EM66,ERR2   ;WRONG DATA IN RLDA
015474  104462                              TRAP    T$ERCODE
015476  000014                              .WORD   12
015500  007166                              .WORD   EM66
015502  010126                              .WORD   ERR2
015504                              2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
015504  104010                              EMT     C$ESCAPE
015506  000012                              .WORD   10000$-.

015510  005723                              TST     (R3)+           ;GET NEXT PATTERN
015512  020327  002500                      CMP     R3,#ENDPAT      ;DONE?
015516  001345                              BNE     1$              ;NO GO BACK
015520                              ENDSEG                          ;****END OF SEGMENT****
015520                              10000$:
015520  104005                              EMT     C$ESEG
015522                              ENDTST                          ;****END OF TEST****
015522                              L10033:
015522  104001                              EMT     C$ETST


```

```
                                .SBTTL  **TEST 14** - BUS RESET OF RLCS

015524                          BGNTST                          ;****START OF TEST****

015524                          STARS
                                ;;*************************************************************
                                ;TEST THAT A BUS RESET WILL CLEAR THE PROPER BITS
                                ;OF THE CONTROL AND STATUS REGISTER.  THOSE BITS ARE
                                ;BITS 6-1,8,9,10,11,12,13,15.  BIT 15 WILL CLEAR ONLY
                                ;IF BIT 14 (DRIVE ERROR IS NOT SET).  BIT 0 (DRIVE READY)
                                ;IS A DON'T CARE.  IF AT THE START UP THIS TEST BIT
                                ;14 (DRIVE ERROR) IS SET WE WILL INSIST IF IS THERE AFTER
                                ;THE "RESET" ALONG WITH BIT 15 (COMPOSITE ERROR).  BITS
                                ;15-10 ARE NOT WRITEABLE.
015524                          STARS
                                ;;*************************************************************


015524                                  SETPRI  #PR107          ;PRIORITY TO SEVEN
015524  012700  000340                  MOV     #PR107,R0
015530  104041                          EMT     C$SPRI
015532  012777  000377  164374          MOV     #377,@RLCS      ;LOAD ALL RLCS LOADABLE BITS
015540  012737  000200  002240          MOV     #CRDY,GDDAT     ;SETUP EXPECTED
015546  032777  040000  164360          BIT     #DERR,@RLCS     ;DRIVE ERR SET?
015554  001403                          BEQ     1$              ;IF NOT DON'T EXPECT IT
015556  052737  140000  002240          BIS     #DERR!ERR,GDDAT  ;IT'S SET, INIT BETTER NOT CLR
015564  012700  000100          1$:     MOV     #100,R0         ;SET UP A WAIT LOOP
015570                                  BRESET                  ;BUS RESET
015570  104033                          EMT     C$RESET
015572  005300                  2$:     DEC     R0              ;WAIT IN CASE OF DRIVE ERROR
015574  001376                          BNE     2$              ;
015576  017737  164332  002242          MOV     @RLCS,BDDAT     ;READ RLCS
015604  042737  000001  002242          BIC     #DRDY,BDDAT     ;CLEAR OUT DRDY - DON'T CARE
015612  023737  002242  002240          CMP     BDDAT,GDDAT     ;DID INIT WORK
015620  001404                          BEQ     3$              ;YES, BRANCH

015622                                  ERRDF   13.,EM67,ERR2   ;WRONG DATA IN RLCS
015622  104462                          TRAP    T$ERCODE
015624  000015                          .WORD   13
015626  007251                          .WORD   EM67
015630  010126                          .WORD   ERR2
015632                          3$:
015632                          ENDTST                          ;****END OF TEST****
015632                          L10034:
015632  104001                          EMT     C$ETST



                                .SBTTL  **TEST 15** - BUS RESET OF RLBA

015634                          BGNTST                          ;****START OF TEST****

015634                          STARS
                                ;;*************************************************************
                                ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
                                ;BUS ADDRESS REGISTER.  THE BUS ADDRESS IS LOADED WITH 177776
                                ;AND IS EXPECTED TO BE ZERO AFTER THE RESET
015634                          STARS
```

```
                                                  ;;*****************************************************************
   293
   294
   295 015634  012777  177776  164274                     MOV     #-2,@RLBA        ;SET BA TO ALL 1'S
   296 015642  005737  002266                             TST     T.CNTLR          ;RL11??
   297 015646  001403                                     BEQ     2$               ;NO
   298 015650  052777  000001  164260                     BIS     #1,@RLBA
   299 015656  005037  002240                     2$:     CLR     GDDAT            ;CLEAR EXPECTED DATA
   300 015662                                             BRESET                   ;ISSUE BUS INIT
       015662  104033                                     EMT     C$RESET
   301 015664  017737  164246  002242                     MOV     @RLBA,BDDAT      ;READ RLBA
   302 015672  001404                                     BEQ     1$               ;IF CLEAR BRANCH
   303
   304 015674                                             ERRDF   14.,EM70,ERR2    ;WRONG DATA IN RLBA
       015674  104462                                     TRAP    T$ERCODE
       015676  000016                                     .WORD   14
       015700  007306                                     .WORD   EM70
       015702  010126                                     .WORD   ERR2
   305 015704                                     1$:
   306
   307 015704                                     ENDTST                           ;****END OF TEST****
       015704                                     L10035:
       015704  104001                                     EMT     C$ETST
   308
   309
   310                                            .SBTTL  **TEST 16** - BUS RESET OF RLDA
   311
   312 015706                                     BGNTST                           ;****START OF TEST****
   313
   314 015706                                     STARS
                                                  ;;*****************************************************************
   315                                            ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
   316                                            ;DISK ADDRESS REGISTER.  THE DISK ADDRESS IS LOADED WITH 177777
   317                                            ;AND IS EXPECTED TO BE ZERO AFTER THE RESET.
   318 015706                                     STARS
                                                  ;;*****************************************************************
   319
   320
   321 015706  012777  177777  164224                     MOV     #-1,@RLDA        ;SET DA TO ALL 1'S
   322 015714  005037  002240                             CLR     GDDAT            ;CLEAR EXPECTED
   323 015720                                             BRESET                   ;ISSUE BUS INIT
       015720  104033                                     EMT     C$RESET
   324 015722  017737  164212  002242                     MOV     @RLDA,BDDAT      ;READ RLDA
   325 015730  001404                                     BEQ     1$               ;IF CLEAR BRANCH
   326
   327 015732                                             ERRDF   15.,EM71,ERR2    ;WRONG DATA IN RLDA
       015732  104462                                     TRAP    T$ERCODE
       015734  000017                                     .WORD   15
       015736  007343                                     .WORD   EM71
       015740  010126                                     .WORD   ERR2
   328 015742                                     1$:
   329
   330 015742                                     ENDTST                           ;****END OF TEST****
       015742                                     L10036:
       015742  104001                                     EMT     C$ETST
   331
   332
```

```
                                          .SBTTL  **TEST 17** - UNIQUENESS OF RLCS

 015744                                   BGNTST                          ;****START OF TEST****

 015744                                   STARS
                                          ;;****************************************************************
                                          ;TEST THE UNIQUENESS OF THE CONTROL AND STATUS
                                          ;REGISTER.  THE RLBA AND RLDA ARE PRELOADED WITH
                                          ;177776 AND 177777 RESPECTIVELY.  THE RLCS IS THEN
                                          ;LOADED TO INSURE THAT NEITHER THE RLBA OR RLDA
                                          ;ARE MODIFIED BY THE WRITING OF THE RLCS.
 015744                                   STARS
                                          ;;****************************************************************


 015744  012737  000201  002210                   MOV     #DRDY!CRDY,LDCSR        ;SET DRIVE AND CONTROLLER READY
 015752  012777  177776  164156                   MOV     #-2,@RLBA               ;SET RLBA TO ALL 1'S
 015760  012777  177777  164152                   MOV     #-1,@RLDA               ;SET RLDA TO ALL 1'S
 015766  013777  002210  164140                   MOV     LDCSR,@RLCS             ;WRITE RLCS

                                          ;CHECK THAT RLBA REMAINED UNEFFECTED

 015774  022777  177776  164134                   CMP     #-2,@RLBA       ;RLBA OKAY?
 016002  001412                                   BEQ     1$              ;YES, GO CHECK DA

 016004  012737  177776  002240                   MOV     #-2,GDDAT       ;SET UP EXPECTED
 016012  017737  164120  002242                   MOV     @RLBA,BDDAT     ;READ RLBA

 016020                                           ERRDF   16.,EM72,ERR2   ;CS MODIFIED BA
 016020  104462                                   TRAP    T$ERCODE
 016022  000020                                   .WORD   16
 016024  007400                                   .WORD   EM72
 016026  010126                                   .WORD   ERR2
 016030                                   1$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
 016030  104006                                   EMT     C$CLP1

 016032  022777  177777  164100                   CMP     #-1,@RLDA       ;RLDA OKAY?
 016040  001412                                   BEQ     2$              ;YES, CONTINUE

 016042  012737  177777  002240                   MOV     #-1,GDDAT       ;SET UP EXPECTED
 016050  017737  164064  002242                   MOV     @RLDA,BDDAT     ;READ DA

 016056                                           ERRDF   17.,EM73,ERR2   ;CS MODIFIED DA
 016056  104462                                   TRAP    T$ERCODE
 016060  000021                                   .WORD   17
 016062  007433                                   .WORD   EM73
 016064  010126                                   .WORD   ERR2
 016066                                   2$:


 016066                                   ENDTST                  ;****END OF TEST****
 016066                                   L10037:
 016066  104001                                   EMT     C$ETST


                                          .SBTTL  **TEST 18** - UNIQUENESS OF RLBA

```

```
016070                                     BGNTST                                  ;****START OF TEST****
016070                                     STARS
                                           ;;*************************************************************
                                           ;TEST THE UNIQUENESS OF THE BUS ADDRESS REGISTER.  THE
                                           ;RLCS AND RLDA ARE LOADED WITH XXX20X AND 177777
                                           ;RESPECTIVELY.  THE RLBA IS THEN WRITTEN TO INSURE
                                           ;THAT NEITHER THE RLCS OR RLDA ARE MODIFIED
                                           ;BY WRITING THE RLBA.
016070                                     STARS
                                           ;;*************************************************************


016070  012737  000200  002240                     MOV     #CRDY,GDDAT         ;CONTROLLER READY
016076  032777  040000  164030                     BIT     #DERR,@RLCS         ;IF DRIVE ERROR IS
016104  001403                                     BEQ     99$                 ;SET THEN EXPECT IT
016106  052737  140000  002240                     BIS     #ERR!DERR,GDDAT     ;SET WHEN WE READ IT.
016114  013777  002240  164012     99$:            MOV     GDDAT,@RLCS         ;LOAD RLCS
016122  012777  177777  164010                     MOV     #-1,@RLDA           ;LOAD RLDA
016130  005077  164002                             CLR     @RLBA               ;CLEAR RLBA

                                           ;CHECK IF RLCS IS OKAY

016134  017737  163774  002242                     MOV     @RLCS,BDDAT         ;READ RLCS
016142  042737  000001  002242                     BIC     #DRDY,BDDAT         ;IGNORE DRIVE READY
016150  023737  002242  002240                     CMP     BDDAT,GDDAT         ;CS OK?
016156  001404                                     BEQ     1$                  ;YES, GO CHECK DA

016160                                             ERRDF   18.,EM74,ERR2       ;BA MODIFIED CS
016160  104462                                     TRAP    T$ERCODE
016162  000022                                     .WORD   18
016164  007466                                     .WORD   EM74
016166  010126                                     .WORD   ERR2
016170                             1$:             CKLOOP                      ;CHECK IF /FL:LOE IS SET
016170  104006                                     EMT     C$CLP1

016172  022777  177777  163740                     CMP     #-1,@RLDA           ;IS RLDA OKAY?

016200  001412                                     BEQ     2$                  ;IF OKAY BRANCH

016202  012737  177777  002240                     MOV     #-1,GDDAT           ;SET UP EXPECTED
016210  017737  163724  002242                     MOV     @RLDA,BDDAT         ;READ RLDA

016216                                             EPRDF   19.,EM75,ERR2       ;BA MODIFIED DA
016216  104462                                     TRAP    T$ERCODE
016220  000023                                     .WORD   19
016222  007520                                     .WORD   EM75
016224  010126                                     .WORD   ERR2
016226                             2$:
016226                             ENDTST                                      ;****END OF TEST****
016226                             L10040:
016226  104001                                     EMT     C$ETST



                                   .SBTTL  **TEST 19** - UNIQUENESS OF RLDA

016230                             BGNTST                                      ;****START OF TEST****

```

```

016230                            STARS
                                  ;;**************************************************************
                                  ;TEST THE UNIQUENESS OF THE DISK ADDRESS REGISTER.  THE RLCS
                                  ;AND RLBA ARE LOADED WITH XXX20X AND 177776
                                  ;RESPECTIVELY.  THE RLDA IS THEN WRITTEN TO INSURE
                                  ;THAT NEITHER THE RLCS OR THE RLBA ARE MODIFIED
                                  ;BY WRITING THE RLDA.
016230                            STARS
                                  ;;**************************************************************


016230  012737  000200  002240            MOV     #CRDY,GDDAT       ;CONTROLLER READY
016236  032777  040000  163670            BIT     #DERR,@RLCS       ;IF DRIVE ERROR SET
016244  001403                            BEQ     99$               ;THEN EXPECT IT LATER
016246  052737  140000  002240            BIS     #ERR!DERR,GDDAT
016254  013777  002240  163652    99$:    MOV     GDDAT,@RLCS       ;LOAD CS
016262  012777  177776  163646            MOV     #-2,@RLBA         ;LOAD BA WITH ALL 1'S
016270  005077  163644                    CLR     @RLDA             ;CLEAR RLDA

                                  ;CHECK IF RLCS IS OKAY

016274  017737  163634  002242            MOV     @RLCS,BDDAT       ;READ RLCS
016302  042737  000001  002242            BIC     #DRDY,BDDAT       ;IGNORE DRIVE READY
016310  023737  002240  002242            CMP     GDDAT,BDDAT       ;RLCS OKAY?
016316  001404                            BEQ     1$                ;YES, THEN BRANCH

016320                                    ERRDF   20.,EM76,ERR2     ;DA MODIFIED CS
016320  104462                            TRAP    T$ERCODE
016322  000024                            .WORD   20
016324  007552                            .WORD   EM76
016326  010126                            .WORD   ERR2
016330                            1$:     CKLOOP                    ;CHECK IF /FL:LOE IS SET
016330  104006                            EMT     C$CLP1

016332  022777  177776  163576            CMP     #-2,@RLBA         ;IS RLBA OKAY?
016340  001412                            BEQ     2$                ;BRANCH IF OKAY

016342  012737  177776  002240            MOV     #-2,GDDAT         ;SET UP EXPECTED
016350  017737  163562  002242            MOV     @RLBA,BDDAT       ;READ RLBA

016356                                    ERRDF   21.,EM77,ERR2     ;DA MODIFIED BA
016356  104462                            TPAP    T$ERCODE
016360  000025                            .WORD   21
016362  007605                            .WORD   EM77
016364  010126                            .WORD   ERR2
016366                            2$:


016366                            ENDTST                            ;****END OF TEST****
016366                            L10041:
016366  104001                            EMT     C$ETST

                                  .SBTTL  **TEST 20** - UNIQUENESS OF RLMP

016370                            BGNTST                            ;****START OF TEST****

```

```

    016370                                     STARS
                                               ;;*************************************************************
                                               ;TEST THE UNIQUENESS OF THE MULTI-PURPOSE REGISTER
                                               ;WE WILL WRITE THE RLCS, RLBA, AND THE RLDA, THEN THE
                                               ;RLMP IS WRITTEN. WE THEN GO BACK AN VERIFY THE CONTENTS
                                               ;OF THE RLCS, RLBA, RLDA.
    016370                                     STARS
                                               ;;*************************************************************


    016370  012737  000200  002240                     MOV     #CRDY,GDDAT         ;CONTROLLER READY
    016376  032777  040000  163530                     BIT     #DERR,@RLCS         ;IF DRIVE ERROR SET
    016404  001403                                     BEQ     99$                 ;THE EXPECT IT LATER
    016406  052737  140000  002240                     BIS     #ERR!DERR,GDDAT
    016414  013777  002240  163512     99$:            MOV     GDDAT,@RLCS         ;LOAD CS
    016422  012777  177776  163506                     MOV     #-2,@RLBA           ;LOAD BA WITH ALL 1'S
    016430  012777  177777  163502                     MOV     #-1,@RLDA           ;LOAD RLDA
    016436  005077  163500                             CLR     @RLMP               ;WRITE RLMP

                                               ;CHECK IF RLCS IS OKAY

    016442  017737  163466  002242                     MOV     @RLCS,BDDAT         ;READ RLCS
    016450  042737  000001  002242                     BIC     #DRDY,BDDAT         ;IGNORE DRIVE READY
    016456  023737  002240  002242                     CMP     GDDAT,BDDAT         ;RLCS OKAY?
    016464  001404                                     BEQ     1$                  ;YES, THEN BRANCH

    016466                                             ERRDF   201.,EM44,ERR2  ;MP MODIFIED CS
    016466  104462                                     TRAP    T$ERCODE
    016470  000311                                     .WORD   201
    016472  006121                                     .WORD   EM44
    016474  010126                                     .WORD   ERR2
    016476                             1$:             CKLOOP                      ;CHECK IF /FL:LOE IS SET
    016476  104006                                     EMT     C$CLP1

    016500  022777  177776  163430                     CMP     #-2,@RLBA           ;IS RLBA OKAY?
    016506  001412                                     BEQ     2$                  ;BRANCH IF OKAY

    016510  012737  177776  002240                     MOV     #-2,GDDAT           ;SET UP EXPECTED
    016516  017737  163414  002242                     MOV     @RLBA,BDDAT         ;READ RLBA

    016524                                             ERRDF   211.,EM45,ERR2  ;MP MODIFIED BA
    016524  104462                                     TRAP    T$ERCODE
    016526  000323                                     .WORD   211
    016530  006154                                     .WORD   EM45
    016532  010126                                     .WORD   ERR2
    016534                             2$:             CKLOOP                      ;CHECK IF /FL:LOE IS SET
    016534  104006                                     EMT     C$CLP1
    016536  022777  177777  163374                     CMP     #-1,@RLDA           ;DISK ADDRESS OKAY
    016544  001412                                     BEQ     3$                  ;YES, CONTINUE

    016546  017737  163366  002242                     MOV     @RLDA,BDDAT         ;SET UP BAD
    016554  012737  177777  002240                     MOV     #-1,GDDAT           ;SET UP EXPECTED

    016562                                             ERRDF   212.,EM46,ERR2  ;MP MODIFIED DA
    016562  104462                                     TRAP    T$ERCODE
    016564  000324                                     .WORD   212
```

```
     016566  006207                           .WORD   EM46
     016570  010126                           .WORD   ERR2

     016572                           3$:


     016572                           ENDTST                          ;****END OF TEST****
     016572                           L10042:
     016572  104001                           EMT     C$ETST

                                      .SBTTL  **TEST 21** - NOOP FUNCTION(RL11 ONLY)

     016574                           BGNTST                          ;****START OF TEST****



     016574                           STARS
                                      ;;****************************************************************
                                      ;TEST THAT NOOP WILL FUNCTION.  WE WILL ISSUE THE
                                      ;NOOP AND WAIT FOR CONTROLLER READY TO SET.  A
                                      ;TIMEOUT OF 200 MILLISECS IS ALLOWED.  DRIVE 0 IS ALWAYS
                                      ;SELECTED SINCE THE DRIVE IS NOT NECESSARY.
     016574                           STARS
                                      ;;****************************************************************


     016574  005737  002266                   TST     T.CNTLR         ;RLV11??
     016600  001410                           BEQ     99$             ;YES SKIP TEST


     016602  004537  013102                   JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
     016606  000000                           NOOP0                   ;NOOP(0) FUNCTION
     016610  004537  013712                   JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
     016614                           2$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
     016614  104006                           EMT     C$CLP1

     016616  004537  012602                   JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS

     016622                           99$:
     016622                           ENDTST                          ;****END OF TEST****
     016622                           L10043:
     016622  104001                           EMT     C$ETST


                                      .SBTTL  **TEST 22** - TEST NOOP DOES NOTHING

     016624                           BGNTST                          ;****START OF TEST****

     016624                           STARS
                                      ;;****************************************************************
                                      ;TEST THAT ISSUING A NOOP FUNCTION DOES NOTHING.  THIS IS DONE BY WRITING
                                      ;THE RLBA, AND RLDA, READING THE RLMP AND MAKING SURE NOTHING CHANGES.
     016624                           STARS
                                      ;;****************************************************************

     016624  005737  002266                   TST     T.CNTLR         ;RLV11??
     016630  001476                           BEQ     3$
```

```

016632  012777  000001  163300          MOV     #1,@RLDA        ;LOAD DISK ADDRESS
016640  012777  000002  163270          MOV     #2,@RLBA        ;LOAD BUS ADDRESS
016646  005077  163270                  CLR     @RLMP
016652  017737  163264  002240          MOV     @RLMP,GDDAT     ;READ RLMP

016660  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
016664  000000                          NOOPO
016666  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
016672                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
016672  104006                          EMT     C$CLP1

016674  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
016700                                  ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
016700  104010                          EMT     C$ESCAPE
016702  000124                          .WORD   L10044-.

016704  017737  163232  002242          MOV     @RLMP,BDDAT     ;READ RLMP
016712  023737  002240  002242          CMP     GDDAT,BDDAT     ;RLMP OK?
016720  001404                          BEQ     1$

016722                                  ERRDF   202.,EM14,ERR2
016722  104462                          TRAP    T$ERCODE
016724  000312                          .WORD   202
016726  005221                          .WORD   EM14
016730  010126                          .WORD   ERR2

016732                          1$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
016732  104006                          EMT     C$CLP1

016734  012737  000002  002240          MOV     #2,GDDAT        ;SET UP EXP'D BA
016742  017737  163170  002242          MOV     @RLBA,BDDAT     ;READ BA
016750  023737  002240  002242          CMP     GDDAT,BDDAT     ;BA OK?
016756  001404                          BEQ     2$              ;YES

016760                                  ERRDF   203.,EM15,ERR2
016760  104462                          TRAP    T$ERCODE
016762  000313                          .WORD   203
016764  005247                          .WORD   EM15
016766  010126                          .WORD   ERR2

016770                          2$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
016770  104006                          EMT     C$CLP1

016772  012737  000001  002240          MOV     #1,GDDAT        ;SET UP EXP'D DA
017000  017737  163134  002242          MOV     @RLDA,BDDAT     ;READ DA
017006  023737  002240  002242          CMP     GDDAT,BDDAT     ;DA OKAY
017014  001404                          BEQ     3$

017016                                  ERRDF   204.,EM16,ERR2
017016  104462                          TRAP    T$ERCODE
017020  000314                          .WORD   204
017022  005275                          .WORD   EM16
017024  010126                          .WORD   ERR2

017026                          3$:

```

```
017026                          ENDTST                          ;****END OF TEST****
017026                          L10044:
017026  104001                          EMT     C$ETST


                                .SBTTL  **TEST 23** - TEST OF INTERRUPT

017030                          BGNTST                          ;****START OF TEST****

017030                          STARS
                                ;;*************************************************************
                                ;CHECK THE INTERRUPT WITH A NOOP.  WE WILL SET UP THE
                                ;INTERRUPT VECTOR, LOWER THE PSW TO ZERO AND ISSUE
                                ;A NOOP.  THE INTERRUPT SERVICE ROUTINE WILL SET A
                                ;FLAG UPON INTERRUPT AND RETURN IN LINE.  WE WAIT 200 MILLISECONDS
                                ;LOOKING FOR THAT FLAG TO BE SET BEFORE CALLING IT
                                ;AN ERROR.  IF THE INTERRUPT SENDS US TO ANOTHER
                                ;VECTOR ADDRESS THEN THE ERROR HANDLER WILL REPORT
                                ;"TRAP TO XXXX FROM YYYY" AND RETURN  TO DIAG SUP MONITOR.  IF THE
                                ;INTERRUPT GOES TO ABOVE 1000 WHO KNOWS WHAT WILL HAPPEN.
017030                          STARS
                                ;;*************************************************************


017030  005737  002266                  TST     T.CNTLR
017034  001426                          BEQ     99$

017036  005037  002206                  CLR     INTFLG          ;CLEAR INTERRUPT OCCRUANCE FLAG
017042                                  SETPRI  #PRI00          ;SET PSW TO 0
017042  012700  000000                  MOV     #PRI00,R0
017046  104041                          EMT     C$SPRI
017050  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
017054  000100                          NOOPO!INTEN             ;NOOP AND INTERRUPT ENABLE
017056  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
017062  005737  002206                  TST     INTFLG          ;DID INTERRUPT OCCUR
017066  001004                          BNE     2$              ;IF SO BRANCH
017070                                  ERRDF   22.,EM13,ERRO
017070  104462                          TRAP    T$ERCODE
017072  000026                          .WORD   22
017074  005167                          .WORD   EM13
017076  010076                          .WORD   ERRO
017100  005037  002206          2$:     CLR     INTFLG
017104                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
017104  104006                          EMT     C$CLP1
017106  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS


017112                          99$:
017112                          ENDTST                          ;****END OF TEST****
017112                          L10045:
017112  104001                          EMT     C$ETST


                                .SBTTL  **TEST 24** - TEST PRIORITY BR LEVEL

017114                          BGNTST                          ;****START OF TEST****

```

```
    638 017114                                  STARS
                                                ;;*************************************************************
    639                                         ;TEST THAT PRIORITY GIVEN IS ACTUAL PRIORITY OF CONTROLLER.  WE KNOW
    640                                         ;THE BOARD WILL INTERRUPT.  WE WILL START TRYING TO INTERRUPT AT 7
    641                                         ;AND WOPK DOWN TIL IT DOES INTERRUPT.
    642 017114                                  STARS
                                                ;;*************************************************************
    643
    644 017114  005737  002266                          TST     T.CNTLR         ;RLV11??
    645 017120  001456                                  BEQ     6$              ;YES, SKIP TEST
    646
    647 017122  012737  000340  002242                  MOV     #340,BDDAT      ;SET UP INITIAL OF 7
    648 017130  013737  002146  002240                  MOV     BPRIOR,GDDAT    ;GET GIVEN PRIORITY
    649
    650 017136                                  BGNSEG                          ;****START OF SEGMENT****
        017136  104004                                  EMT     C$BSEG
    651
    652 017140  005037  002206                  5$:     CLR     INTFLG          ;CLEAR INTERRUPT OCCURRANCE
    653 017144                                          SETPRI  BDDAT           ;SET PRIORITY
        017144  013700  002242                          MOV     BDDAT,R0
        017150  104041                                  EMT     C$SPRI
    654
    655 017152  004537  013102                          JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
    656 017156  000100                                  NOOPO!INTEN
    657
    658 017160  004537  013712                          JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
    659 017164                                          ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
        017164  104010                                  EMT     C$ESCAPE
        017166  000070                                  .WORD   L10046-.
    660
    661 017170  004537  012602                          JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
    662 017174                                          ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
        017174  104010                                  EMT     C$ESCAPE
        017176  000060                                  .WORD   L10046-.
    663
    664 017200  023737  002242  002240                  CMP     BDDAT,GDDAT     ;SHOULD IT INTERRUPT
    665 017206  002012                                  BGE     1$              ;NO, BRANCH
    666
    667 017210  005737  002206                          TST     INTFLG          ;DID INTERRUPT OCCUR
    668 017214  001004                                  BNE     2$              ;YES, OK
    669
    670 017216                                  3$:     ERRDF   204.,EM17,ERR7
        017216  104462                                  TRAP    T$ERCODE
        017220  000314                                  .WORD   204
        017222  005323                                  .WORD   EM17
        017224  010364                                  .WORD   ERR7
    671
    672 017226                                  2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
        017226  104010                                  EMT     C$ESCAPE
        017230  000014                                  .WORD   10000$-.
    673 017232  000405                                  BR      4$
    674 017234  005737  002206                  1$:     TST     INTFLG          ;DID INTERRUPT OCCUR
    675 017240  001772                                  BEQ     2$              ;NO, OK
    676 017242  000765                                  BR      3$              ;YES, ERROR
    677
    678 017244                                  ENDSEG                          ;****END OF SEGMENT****
        017244                                  10000$:
```

```
        017244  104005                                   EMT     C$ESEG
    679 017246  162737  000040  002242  4$:              SUB     #40,BDDAT           ;NEXT LEVEL
    680 017254  100331                                   BPL     5$
    681
    682 017256                          6$:
    683 017256                          ENDTST                                       ;****END OF TEST****
        017256                          L10046:
        017256  104001                                   EMT     C$ETST
    684
    685                                 .SBTTL   **TEST 25** - GET STATUS FUNCTION
    686
    687 017260                          BGNTST                                       ;****START OF TEST****
    688
    689
    690 017260                          STARS
                                        ;;**************************************************************
    691                                 ;TEST GET STATUS FUNCTION.  THE GET STATUS FUNCTION WILL
    692                                 ;WORK IF DRIVE IS LOADED AND READY OR NOT.  THE RLDA
    693                                 ;IS LOADED WITH THE GET STATUS AND MARKER BITS (BITS 1,0)
    694                                 ;AND THE FUNCTION IS ISSUED.  WE WAIT 200 MILLISECONDS
    695                                 ;FOR CONTROLLER READY.  VERIFY THAT NO ERRORS OCCUR.
    696 017260                          STARS
                                        ;;**************************************************************
    697
    698
    699 017260  012777  000013  162652                   MOV     #GSBIT!MK!DRST,@RLDA    ;SET GET STATUS AND MARKER BIT
    700 017266  004537  013102                           JSR     R5,LDFUNC           ;ISSUE FUNCTION OF FOLLOWING WORD
    701 017272  000004                                   GSTAT                       ;GET STATUS
    702 017274  004537  013712                           JSR     R5,WTCRDY           ;WAIT FOR CONTROLLER READY HIGH
    703 017300                          2$:              CKLOOP                      ;CHECK IF /FL:LOE IS SET
        017300  104006                                   EMT     C$CLP1
    704
    705 017302  004537  012602                           JSR     R5,CHERR            ;CHECK CONTROLLER FOR ERRORS
    706
    707 017306                          ENDTST                                       ;****END OF TEST****
        017306                          L10047:
        017306  104001                                   EMT     C$ETST
    708
    709
    710                                 .SBTTL   **TEST 26** - GET STATUS FUNCTION INTERRUPT
    711
    712 017310                          BGNTST                                       ;****START OF TEST****
    713
    714                                 ;CHECK GET STATUS UNDER INTERRUPT
    715
    716 017310  005037  002206                           CLR     INTFLG              ;CLEAR INTERRUPT OCCURANCE
    717 017314                                           SETPRI  #PRI00              ;PSW TO LEVEL 0
        017314  012700  000000                           MOV     #PRI00,R0
        017320  104041                                   EMT     C$SPRI
    718 017322  012777  000003  162610                   MOV     #GSBIT!MK,@RLDA ;SET UP DA
    719 017330  004537  013102                           JSR     R5,LDFUNC           ;ISSUE FUNCTION OF FOLLOWING WORD
    720 017334  000104                                   GSTAT!INTEN                 ;GET STATUS, INT ENABLE
    721 017336  004537  013712                           JSR     R5,WTCRDY           ;WAIT FOR CONTROLLER READY HIGH
    722 017342                                           SETPRI  #PRI07
        017342  012700  000340                           MOV     #PRI07,R0
        017346  104041                                   EMT     C$SPRI
    723 017350  005737  002206                           TST     INTFLG              ;DID INTERRUPT OCCUR
    724 017354  001004                                BNE     2$               ;YES-BRANCH
    725 017356                                        ERRDF   28.,EM30,ERRO
        017356  104462                                TRAP    T$ERCODE
        017360  000034                                .WORD   28
        017362  005356                                .WORD   EM30
        017364  010076                                .WORD   ERRO
    726 017366                              2$:       CKLOOP                   ;CHECK IF /FL:LOE IS SET
        017366  104006                                EMT     C$CLP1
    727 017370  004537  012602                        JSR     R5,CHERR         ;CHECK CONTROLLER FOR ERRORS
    728 017374  005037  002206                        CLR     INTFLG           ;CLEAR INTERRUPT OCCURANCE
    729 017400                                        SETPRI  #PRI00           ;PSW TO LEVEL 0
        017400  012700  000000                        MOV     #PRI00,R0
        017404  104041                                EMT     C$SPRI
    730 017406  012777  000003  162524                MOV     #GSBIT!MK,@RLDA ;SET UP DA FOR GET STATLS CMD
    731 017414  004537  013102                        JSR     R5,LDFUNC        ;ISSUE FUNCTION OF FOLLOWING WORD
    732 017420  000004                                GSTAT                    ;GET STATUS - SHOULD NOT CAUSE AN INTERRUPT
    733 017422  004537  013712                        JSR     R5,WTCRDY        ;WAIT FOR CONTROLLER READY HIGH
    734 017426                                        SETPRI  #PRI07
        017426  012700  000340                        MOV     #PRI07,R0
        017432  104041                                EMT     C$SPRI
    735 017434  005737  002206                        TST     INTFLG           ;DID INTERRUPT OCCUR (SHOULD NOT)
    736 017440  001404                                BEQ     3$               ;NO - BRANCH (OK)
    737 017442                                        ERRDF   281.,EM30A,ERRO
        017442  104462                                TRAP    T$ERCODE
        017444  000431                                .WORD   281
        017446  005415                                .WORD   EM30A
        017450  010076                                .WORD   ERRO
    738 017452                              3$:       CKLOOP                   ;CHECK IF /FL:LOE IS SET
        017452  104006                                EMT     C$CLP1
    739 017454  004537  012602                        JSR     R5,CHERR         ;CHECK CONTROLLER FOR ERRORS
    740 017460                              ENDTST                             ;****END OF TEST****
        017460                              L10050:
        017460  104001                                EMT     C$ETST
    741
    742
    743                                     .SBTTL  **TEST 27** - GET STATUS FUNCTION GENERATES OPI W/O GS BIT
    744
    745 017462                              BGNTST                             ;****START OF TEST****
    746
    747 017462                              STARS
                                            ;;****************************************************************
    748                                     ;VERIFY THAT GET STATUS FUNCTION WILL NOT COMPLETE
    749                                     ;WITHOUT SENDING OUT THE GET STATUS BIT IN THE RLDA.
    750                                     ;WE SET MARKER BUT NO GET STATUS BIT IN THE RLDA AND
    751                                     ;ISSUE A GET STATUS WE SHOULD RECIEVE AN OPI ERROR.
    752                                     ;VERIFY THAT CONTROLLER READY SETS AND OPI SETS
    753 017462                              STARS
                                            ;;****************************************************************
    754
    755
    756 017462  012777  000001  162450                MOV     #MK,@RLDA        ;SET ONLY MARKER BIT!!
    757 017470  004537  013102                        JSR     R5,LDFUNC        ;ISSUE FUNCTION OF FOLLOWING WORD
    758 017474  000004                                GSTAT                    ;GET STATUS
    759 017476  004537  013712                        JSR     R5,WTCRDY        ;WAIT FOR CONTROLLER READY HIGH
    760 017502  032737  074000  002166                BIT #74000,E.CS
    761 017510  001405                                BEQ     1$
    762 017512  012737  003770  013064                MOV     #OPIERR,RESTMS
```

```
017520  004537  012602                  JSR     R5,CHERR
017524                          1$:     CKLOOP
017524  104006                          EMT     C$CLP1
017526  032737  002000  002166          BIT     #OPI,E.CS       ;IS OPI SET?
017534  001004                          BNE     2$              ;YES-BRANCH NO-CHECK TIMEOUT
017536                                  ERRDF   29.,EM33,ERRO
017536  104462                          TRAP    T$ERCODE
017540  000035                          .WORD   29
017542  005511                          .WORD   EM33
017544  010076                          .WORD   ERRO
017546                          2$:

017546                          ENDTST                          ;****END OF TEST****
017546                          L10051:
017546  104001                          EMT     C$ETST



                                .SBTTL  **TEST 28** - OPI UNDER INTERRUPT

017550                          BGNTST                          ;****START OF TEST****
017550                          STARS
                                ;;****************************************************************
                                ;FORCE AN OPI ERROR UNDER INTERRUPT TO VERIFY THAT
                                ;AN INTERRUPT WILL OCCUR FROM OPI.  THE OPI IS FORCED
                                ;USING A GET STATUS WITHOUT THE GET STATUS BIT SET
                                ;IN RLDA.
017550                          STARS
                                ;;****************************************************************


017550                                  SETPRI  #PRI00
017550  012700  000000                  MOV     #PRI00,R0
017554  104041                          EMT     C$SPRI
017556  005037  002206                  CLR     INTFLG
017562  012777  000001  162350          MOV     #MK,@RLDA       ;SET ONLY MARKER BIT!!
017570  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
017574  000104                          GSTAT!INTEN             ;GET STATUS
017576  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
017602                                  SETPRI  #PRI07
017602  012700  000340                  MOV     #PRI07,R0
017606  104041                          EMT     C$SPRI
017610  005737  002206                  TST     INTFLG          ;INTERRUPT OCCUR
017614  001004                          BNE     2$

017616                                  ERRDF   30.,EM11,ERRO
017616  104462                          TRAP    T$ERCODE
017620  000036                          .WORD   30
017622  005126                          .WORD   EM11
017624  010076                          .WORD   ERRO

017626                          2$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
017626  104006                          EMT     C$CLP1

017630  032737  074000  002166          BIT     #74000,E.CS
017636  001405                          BEQ     1$
017640  012737  003770  013064          MOV     #OPIERR,RESTMS
017646  004537  012602                  JSR     R5,CHERR
```

```
017652                          1$:     CKLOOP
017652  104006                          EMT     C$CLP1
017654  032737  002000  002166          BIT     #OPI,E.CS               ;IS OPI SET?
017662  001004                          BNE     3$                      ;YES-BRANCH NO-CHECK TIMEOUT
017664                                  ERRDF   31.,EM33,ERRO
017664  104462                          TRAP    T$ERCODE
017666  000037                          .WORD   31
017670  005511                          .WORD   EM33
017672  010076                          .WORD   ERRO
017674                          3$:


017674                          ENDTST                                  ;****END OF TEST****
017674                          L10052:
017674  104001                          EMT     C$ETST

                                .SBTTL  **TEST 29** - READ HEADER FUNCTION

017676                          BGNTST                                  ;****START OF TEST****
017676                          STARS
                                ;;*************************************************************
                                ;CHECK THAT READ HEADER WORKS, THAT WE CAN ISSUE
                                ;IT, GET READY BACK WITHOUT ANY ERRORS SETTING.
017676                          STARS
                                ;;*************************************************************



017676  004537  013102                  JSR     R5,LDFUNC               ;ISSUE FUNCTION OF FOLLOWING WORD
017702  000010                          RDHDR                           ;READ HEADER
017704  004537  013712                  JSR     R5,WTCRDY               ;WAIT FOR CONTROLLER READY HIGH
                                                                        ;READY
017710                          2$:     CKLOOP                          ;CHECK IF /FL:LOE IS SET
017710  104006                          EMT     C$CLP1

017712  004537  012602                  JSR     R5,CHERR                ;CHECK CONTROLLER FOR ERRORS

017716                          ENDTST                                  ;****END OF TEST****
017716                          L10053:
017716  104001                          EMT     C$ETST

```

```
      1
```

```
                                .SBTTL  **TEST 30** - READ HEADER FUNCTION INTERRUPT

017720                          BGNTST                          ;****START OF TEST****

017720                          STARS
                                ;;**************************************************************
                                ;CHECK THAT READ HEADER WILL GENERATE AN INTERRRUPT
                                ;UPON COMPLETION WITHOUT ANY ERRORS SETTING
017720                          STARS
                                ;;**************************************************************


017720                                  SETPRI  #PRI00          ;PSW TO 0
017720  012700  000000                  MOV     #PRI00,R0
017724  104041                          EMT     C$SPRI
017726  005037  002206                  CLR     INTFLG          ;CLEAR INTERRUPT OCCURANCE
017732  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
017736  000110                          RDHDR!INTEN             ;READ HEADER, INTR. ENA
017740  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
017744                                  SETPRI  #PRI07
017744  012700  000340                  MOV     #PRI07,R0
017750  104041                          EMT     C$SPRI
017752  005737  002206                  TST     INTFLG          ;INTERRUPT HAPPEN
017756  001004                          BNE     2$              ;YES-CONTINUE
017760                                  ERRDF   35.,EM37,ERR0
017760  104462                          TRAP    T$ERCODE
017762  000043                          .WORD   35
017764  005633                          .WORD   EM37
017766  010076                          .WORD   ERR0
017770                          2$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
017770  104006                          EMT     C$CLP1
```

```

017772  004537  012602                          JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS

017776                                  ENDTST                          ;****END OF TEST****
017776                                  L10054:
017776  104001                                  EMT     C$ETST



                                        .SBTTL  **TEST 31** - REPEATED RD HDRS YIELD SAME CYL AND HD

020000                                  BGNTST                          ;****START OF TEST****


020000                                  STARS
                                        ;;**************************************************************
                                        ;CHECKT THAT READ HEADERS WILL RELIABLY READ THE SAME
                                        ;CYLINDER AND HEAD SELECT.  WE WILL READ HEADERS VERIFYING
                                        ;THAT WE ALWAYS READ THE SAME CYLINDER AND HEAD SELECT.
020000                                  STARS
                                        ;;**************************************************************


020000  012701  000144                          MOV     #100.,R1        ;SET UP TO DO 100 RD HDR'S
020004  004537  013102                          JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
020010  000010                                  RDHDR                   ;READ HEADER
020012  004537  013712                          JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
020016                                  99$:    ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
020016  104010                                  EMT     C$ESCAPE
020020  000122                                  .WORD   L10055-.

020022  004537  012602                          JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
020026                                          ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
020026  104010                                  EMT     C$ESCAPE
020030  000112                                  .WORD   L10055-.

020032  013737  002174  002240                  MOV     E.MP,GDDAT      ;READ FIRST HEADER (ASSUME GOOD)
020040  043737  002212  002240                  BIC     SECMSK,GDDAT    ;MASK AWAY SECTOR BITS
020046                                  BGNSEG                          ;****START OF SEGMENT****
020046  104004                                  EMT     C$BSEG
020050                                  2$:
020050  004537  013102                          JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
020054  000010                                  RDHDR
020056  004537  013712                          JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
020062                                  97$:    ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020062  104010                                  EMT     C$ESCAPE
020064  000054                                  .WORD   10000$-.

020066  004537  012602                          JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
020072                                          ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020072  104010                                  EMT     C$ESCAPE
020074  000044                                  .WORD   10000$-.

020076  013737  002174  002242                  MOV     E.MP,BDDAT      ;READ HEADER
020104  043737  002212  002242                  BIC     SECMSK,BDDAT    ;MASK AWAY SECTOR BITS
020112  023737  002240  002242                  CMP     GDDAT,BDDAT     ;IS HEADER CORRECT
020120  001404                                  BEQ     4$

```

```
     45 020122                                   ERRDF   36.,EM41,ERR4
        020122  104462                           TRAP    T$ERCODE
        020124  000044                           .WORD   36
        020126  005673                           .WORD   EM41
        020130  010242                           .WORD   ERR4
     46                                                                  ;CONSTANT CYL & HS
     47 020132                           4$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
        020132  104006                           EMT     C$CLP1
     48
     49 020134  005301                           DEC     R1              ;PERFORM ALL READ HDR'S
     50 020136  001344                           BNE     2$              ;IF NOT GO BACK AND DO ANOTHER
     51 020140                           ENDSEG                          ;****END OF SEGMENT****
        020140                           10000$:
        020140  104005                           EMT     C$ESEG
     52 020142                           ENDTST                          ;****END OF TEST****
        020142                           L10055:
        020142  104001                           EMT     C$ETST
     53
     54
     55                                  .SBTTL  **TEST 32** - CHECK OF HEADER CRC
     56
     57 020144                           BGNTST                          ;****START OF TEST****
     58
     59 020144                           STARS
                                         ;;*************************************************************
     60                                  ;CHECK THAT WE CAN READ THE HDCRC AFTER A
     61                                  ;READ HEADER AND THAT IT IS THE CORRECT CRC
     62                                  ;FOR THE HEADER.
     63 020144                           STARS
                                         ;;*************************************************************
     64
     65
     66 020144  005037  020214                   CLR     3$
     67 020150  004537  013102                   JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
     68 020154  000010                           RDHDR                   ;READ HEADER
     69 020156  004537  013712                   JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
     70 020162                                   ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
        020162  104010                           EMT     C$ESCAPE
        020164  000114                           .WORD   L10056-.
     71
     72 020166  004537  012602                   JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
     73 020172                                   ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
        020172  104010                           EMT     C$ESCAPE
        020174  000104                           .WORD   L10056-.
     74
     75 020176  013737  002174  020212           MOV     E.MP,2$         ;READ HEADER WORD
     76 020204  004537  013460                   JSR     R5,SIMBCC       ;GO CALCULATE CRC
     77 020210  000020                           16.                     ;16 BITS
     78 020212  000000                   2$:     .WORD   0               ;HEADER GOES HERE
     79 020214  000000                   3$:     .WORD   0               ;START WITH 0 CRC
     80 020216  013737  002222  020242           MOV     CALBCC,5$
     81 020224  013737  002176  020240           MOV     E.MP1,4$        ;GET SECOND HALF
     82 020232  004537  013460                   JSR     R5,SIMBCC
     83 020236  000020                           16.
     84 020240  000000                   4$:     .WORD   0
     85 020242  000000                   5$:     .WORD   0
     86 020244  013737  002222  002240           MOV     CALBCC,GDDAT    ;STORE CALCULATED CRC AS GOOD
```

```
020252  013737  002200  002242          MOV     E.MP2,BDDAT     ;THIRD READ OF DB GETS CRC
020260  023737  002240  002242          CMP     GDDAT,BDDAT     ;IS CRC CORRECT?
020266  001404                          BEQ     6$              ;IF SO CONTINUE

020270                                  ERRDF   37.,EM42,ERR4
020270  104462                          TRAP    T$ERCODE
020272  000045                          .WORD   37
020274  005764                          .WORD   EM42
020276  010242                          .WORD   ERR4
020300                          6$:

020300                          ENDTST                          ;****END OF TEST****
020300                          L10056:
020300  104001                          EMT     C$ETST



                                .SBTTL  **TEST 33** - CHECK CONSECUTIVE HEADERS

020302                          BGNTST                          ;****START OF TEST****


020302                          STARS
                                ;;***********************************************************
                                ;CHECK THAT THE HEADERS ARE CONSECUTIVE.  WE WILL DO
                                ;40 (FORTY) READ HEADERS AND STORE EACH.  AFTER WE HAVE
                                ;READ THE FORTIETH HEADER WE WILL VERIFY THAT
                                ;THEY CAME IN SEQUENTIAL, THAT 0 FOLLOWS 39.
                                ;THAT THERE WERE NO ERRORS.
020302                          STARS
                                ;;***********************************************************


020302  005037  002244                  CLR     FIRST           ;CLEAR FIRST READ DONE FLAG
020306  012703  003150                  MOV     #HDRBUF,R3      ;STORE HEADERS
020312  012701  000050                  MOV     #40.,R1         ;FOURTY HEADERS
020316  012737  000210  002154          MOV     #RDHDR!CRDY,B.CS
020324  053737  002152  002154          BIS     DRIVE,B.CS
020332  013777  002154  161574          MOV     B.CS,@RLCS
020340  042777  000200  161566  2$:     BIC     #200,@RLCS
020346  032777  000200  161560  1$:     BIT     #200,@RLCS      ;DONE?
020354  001774                          BEQ     1$
020356  017723  161552                  MOV     @RLCS,(R3)+
020362  017723  161554                  MOV     @RLMP,(R3)+
020366  017723  161550                  MOV     @RLMP,(R3)+
020372  017723  161544                  MOV     @RLMP,(R3)+
020376  005301                          DEC     R1              ;HAVE WE READ FOURTY HEADERS
020400  001357                          BNE     2$              ;GO BACK UNTIL FOURTY DONE
020402  012703  003150                  MOV     #HDRBUF,R3      ;GET LIST OF HEADERS
020406  012701  000050                  MOV     #40.,R1         ;CHECK FOURTY OF THEM
020412  011337  002166                  MOV     (R3),E.CS
020416  005737  002166                  TST     E.CS
020422  100016                          BPL     99$
020424  012737  004227  013064          MOV     #RHDMES,RESTMS
020432  005723                          TST     (R3)+
020434  012337  002174                  MOV     (R3)+,E.MP
020440  012337  002176                  MOV     (R3)+,E.MP1
020444  012337  002200                  MOV     (R3)+,E.MP2
```

```
020450  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
020454  000137  020616                  JMP     7$
020460  005723                  99$:    TST     (R3)+
020462  011337  002242                  MOV     (R3),BDDAT      ;GET HEADER
020466  005737  002244                  TST     FIRST           ;IS THIS FIRST READ?
020472  001007                          BNE     4$              ;NO, BRANCH
020474  012737  000001  002244          MOV     #1,FIRST        ;SET FIRST READ DONE FLAG
020502  013737  002242  002240  3$:     MOV     BDDAT,GDDAT     ;SET UP NEXT READ EXPECTED
020510  000435                          BR      6$              ;GO SEE IF TEST IS DONE
020512  005237  002240          4$:     INC     GDDAT           ;INCREMENT EXP'D HEADER
020516  023737  002242  002240          CMP     BDDAT,GDDAT     ;IS NEW HEADER SEQUENTIAL?
020524  001766                          BEQ     3$              ;YES THEN BRANCH
020526  033737  002212  002242          BIT     SECMSK,BDDAT    ;IS NEW HEADER ZERO?
020534  001015                          BNE     5$              ;NO, THEN ERROR GO REPORT IT
020536  013737  002240  002224          MOV     GDDAT,TEMP2     ;YES, CHECK IF LAST HEADER WAS
020544  043737  002246  002224          BIC     CYLMSK,TEMP2    ;MAX ADDRESS, IF SO BRANCH
020552  023737  002250  002224          CMP     MXSEC1,TEMP2    ;STORE NEW DATA AS OLD
020560  001750                          BEQ     3$              ;AND PERFORM NEW RD HDR
020562  043737  002212  002240          BIC     SECMSK,GDDAT    ;EXPECTING ZERO SECTOR

020570                          5$:

020570  005037  002244                  CLR     FIRST           ;ERROR WILL MAKE US MISS
                                                                ;NEXT SECTOR SEQUENTIALLY
                                                                ;START OVER; CLEAR FIRST FLAG
020574                                  ERRDF   38.,EM43,ERR2
020574  104462                          TRAP    T$ERCODE
020576  000046                          .WORD   38
020600  006022                          .WORD   EM43
020602  010126                          .WORD   ERR2
020604                          6$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
020604  104006                          EMT     C$CLP1

020606  062703  000006                  ADD     #6,R3
020612  005301                          DEC     R1              ;HAVE WE DONE THIS ENOUGH
020614  001321                          BNE     99$             ;NO, GO BACK DO IT AGAIN
020616                          7$:
020616                          ENDTST                          ;****END OF TEST****
020616                          L10057:
020616  104001                          EMT     C$ETST


                                .SBTTL  **TEST 34** - SEEK FUNCTION

020620                          BGNTST                          ;****START OF TEST****
020620                          STARS
                                ;;*************************************************************
                                ;CHECK THE SEEK FUNCTION RETURNS CONTROLLER READY
                                ;WITH NO ERRORS.  WE ISSUE A ONE TRACK IN WORD SEEK.
                                ;WE DO NOT CHECK THE RESULT FOR POSITION
020620                          STARS
                                ;;*************************************************************


020620  012777  000205  161312          MOV     #BIT7.MK!SIGN,@RLDA  ;SET UP DA-DIFF=1,MARKER,TOWARDS
020626  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
020632  000006                          SEEK                    ;SEEK
```

```
020634  004537  013712                        JSR     R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
020640                                        WAITMS  #2.
020640  012700  000002                        MOV     #2.,R0
020644  104026                                EMT     C$WTM
020646                              2$:       CKLOOP                     ;CHECK IF /FL:LOE IS SET
020646  104006                                EMT     C$CLP1


020650  004537  012602                        JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS

020654                              ENDTST                               ;****END OF TEST****
020654                              L10060:
020654  104001                                EMT     C$ETST


                                    .SBTTL  **TEST 35** - CHECK DRIVE READY ON SEEK

020656                              BGNTST                               ;****START OF TEST****


020656                              STARS
                                    ;;*************************************************************
                                    ;CHECK THE SEEK FUNCTION RETURNS DRIVE READY WITH
                                    ;NO ERRORS.  WE ISSUE A ONE TRACK INWARD SEEK.  WE DO
                                    ;NOT CHECK THE RESULT FOR POSITION
020656                              STARS
                                    ;;*************************************************************



020656  012777  000201  161254                MOV     #BIT7.MK,@RLDA     ;SET DA, MARKER, DIFF=1.
020664  004537  013102                        JSR     R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
020670  000006                                SEEK                       ;SEEK
020672  004537  013712                        JSR     R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
020676                                        CKLOOP                     ;CHECK IF /FL:LOE IS SET
020676  104006                                EMT     C$CLP1

020700  004537  012602                        JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
020704                                        CKLOOP                     ;CHECK IF /FL:LOE IS SET
020704  104006                                EMT     C$CLP1

020706  004537  013646                        JSR     R5,WTDRDY          ;WAIT FOR DRIVE READY
020712                                        CKLOOP                     ;CHECK IF /FL:LOE IS SET
020712  104006                                EMT     C$CLP1

020714  004537  012602                        JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS

020720                              ENDTST                               ;****END OF TEST****
020720                              L10061:
020720  104001                                EMT     C$ETST


                                    .SBTTL  **TEST 36** - SEEK FUNCTION INTERRUPT

020722                              BGNTST                               ;****START OF TEST****


```

```
020722                          STARS
                                ;;***************************************************************
                                ;CHECK THAT CONTROLLER READY RESETTING WHEN THE SEEK IS
                                ;INITIATED CAUSES AN INTERRUPT BUT DRIVE READY WILL
                                ;NOT.  WE ALSO MONITOR FOR ANY ERROR BITS SETTING.
020722                          STARS
                                ;;***************************************************************




020722  005037  002206                  CLR     INTFLG
020726                                  SETPRI  #PRI00          ;SET PSW TO 0
020726  012700  000000                  MOV     #PRI00,R0
020732  104041                          EMT     C$SPRI
020734  012777  000205  161176          MOV     #BIT7!MK!SIGN,@RLDA  ;SET UP RLDA
020742  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
020746  000106                          SEEK!INTEN              ;SEEK AND INTR. ENA.
020750  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
020754  000240                          NOP                     ;
020756  005737  002206          1$:     TST     INTFLG          ;DID INTERRUPT OCCUR
020762  001004                          BNE     2$              ;YES, GO CHECK DRDY
020764                                  ERRDF   40.,EM47,ERRO
020764  104462                          TRAP    T$ERCODE
020766  000050                          .WORD   40
020770  006242                          .WORD   EM47
020772  010076                          .WORD   ERRO
020774                          2$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
020774  104006                          EMT     C$CLP1


020776  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
021002                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
021002  104006                          EMT     C$CLP1

021004  005037  002206                  CLR     INTFLG          ;CLEAR INTERRUPT OCCURANCE


021010  004537  013646                  JSR     R5,WTDRDY       ;WAIT FOR DRIVE READY
021014                          5$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
021014  104006                          EMT     C$CLP1

021016                                  SETPRI  #PRI07
021016  012700  000340                  MOV     #PRI07,R0
021022  104041                          EMT     C$SPRI
021024  005737  002206                  TST     INTFLG          ;DID DRIVE READY CAUSE INTERRUPT
021030  001404                          BEQ     6$              ;NO, CONTINUE

021032                                  ERRDF   42.,EM52,ERRO
021032  104462                          TRAP    T$ERCODE
021034  000052                          .WORD   42
021036  006273                          .WORD   EM52
021040  010076                          .WORD   ERRO
021042                          6$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
021042  104006                          EMT     C$CLP1

021044                          ENDTST                          ;****END OF TEST****
```

```
    021044                                L10062:
    021044  104001                                 EMT     C$ETST



                                          .SBTTL  **TEST 37** - TEST DIFFERENCE WORD TRANSMISSION

    021046                                BGNTST                          ;****START OF TEST****




    021046                                STARS
                                          ;;*************************************************************
                                          ;VERIFY THAT THE DIFFERENCE WORD LOADS AND IS
                                          ;TRANSMITTED CORRECTLY.  WE WILL ISSUE SEEKS WITH THE
                                          ;DIFFERENCE WORD CONTAINING ALL OF THE BIT PATTERNS FLOATING 1,
                                          ;GROWING 1, GROWING 0 AND SHITING 0.  THE SEEK WILL
                                          ;START FROM TRACK 0 EACH TIME AND WILL RETURN THERE
                                          ;EACH, THUS BOTH DIRECTIONS FOR PATTERNS WILL BE CHECKED.
                                          ;READ HEADERS ARE USED TO VERIFY THE SEEK CORRECTNESS.
                                          ;ERRORS ARE MONITORED AND REPORTED.
    021046                                STARS
                                          ;;*************************************************************


    021046  012703  002502                         MOV     #SKLST,R3       ;GET LIST OF DIFFERENCE WORDS
    021052                                BGNSEG                          ;****START OF SEGMENT****
    021052  104004                                 EMT     C$BSEG
    021054                                1$:
    021054  004537  013102                         JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
    021060  000010                                 RDHDR                   ;READ HEADER
    021062  004537  013712                         JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
    021066                                98$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
    021066  104006                                 EMT     C$CLP1

    021070  004537  012602                         JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
    021074                                         CKLOOP                  ;CHECK IF /FL:LOE IS SET
    021074  104006                                 EMT     C$CLP1

    021076  013737  002174  002242                 MOV     E.MP,BDDAT      ;READ HEADER
    021104  043737  002212  002242                 BIC     SECMSK,BDDAT    ;CLEAR OUT SECTOR
    021112  001462                                 BEQ     99$             ;IF ON TRACK ZERO, H.S. ZERO, OK

                                          ;NOT ON TRACK ZERO CALCULATE DIFFERENCE WORD AND PUT IT BACK
                                          ;ON ZERO.

    021114  042737  000100  002242                 BIC     #RHHS,BDDAT     ;CLEAR OUT HEAD SELECT
    021122  013777  002242  161010                 MOV     BDDAT,@RLDA     ;PUT CYLINDER AS DIFFERENCE WORD
    021130  052777  000001  161002                 BIS     #MK,@RLDA       ;SET MARKER BIT
    021136  004537  013102                         JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
    021142  000006                                 SEEK                    ;SEEK
    021144  004537  013712                         JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
    021150                                         CKLOOP                  ;CHECK IF /FL:LOE IS SET
    021150  104006                                 EMT     C$CLP1

    021152  004537  012602                         JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
    021156                                         CKLOOP                  ;CHECK IF /FL:LOE IS SET
```

```
     021156  104006                              EMT     C$CLP1
317
318  021160  004537  013646                      JSR     R5,WTDRDY          ;WAIT FOR DRIVE READY
319  021164                             89$:     CKLOOP                     ;CHECK IF /FL:LOE IS SET
     021164  104006                              EMT     C$CLP1
320
321  021166  004537  012602                      JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
322  021172                                      CKLOOP                     ;CHECK IF /FL:LOE IS SET
     021172  104006                              EMT     C$CLP1
323
324  021174  004537  013102                      JSR     R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
325  021200  000010                              RDHDR                      ;READ HEADER
326  021202  004537  013712                      JSR     R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
327  021206                             96$:     CKLOOP                     ;CHECK IF /FL:LOE IS SET
     021206  104006                              EMT     C$CLP1
328
329  021210  004537  012602                      JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
330  021214                                      CKLOOP                     ;CHECK IF /FL:LOE IS SET
     021214  104006                              EMT     C$CLP1
331
332  021216  005037  002240                      CLR     GDDAT              ;CLEAR EXPECTED
333  021222  013737  002242  002254              MOV     BDDAT,DWORD        ;SAVE DIFFERENCE WORD
334  021230  013737  002174  002242              MOV     E.MP,BDDAT         ;READ HEADER
335  021236  043737  002212  002242              BIC     SECMSK,BDDAT       ;MASK OUT SECTOR BITS
336  021244  001404                              BEQ     5$                 ;BRANCH IF ON ZERO TRACK
337
338  021246                                      ERRDF   43.,EM54,ERR3
     021246  104462                              TRAP    T$ERCODE
     021250  000053                              .WORD   43
     021252  006343                              .WORD   EM54
     021254  010170                              .WOPD   ERR3
339  021256                             5$:      CKLOOP                     ;CHECK IF /FL:LOE IS SET
     021256  104006                              EMT     C$CLP1
340
341  021260  011377  160654             99$:     MOV     (R3),@RLDA         ;GET DIFFERENCE WORD
342  021264  052777  000005  160646              BIS     #SIGN!MK,@RLDA     ;SET SIGN (TOWARDS SPINDLE) AND MARKER
343  021272  004537  013102                      JSR     R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
344  021276  000006                              SEEK                       ;SEEK
345  021300  004537  013712                      JSR     R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
346  021304                                      CKLOOP                     ;CHFCK IF /FL:LOE IS SET
     021304  104006                              EMT     C$CLP1
347
348  021306  004537  012602                      JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
349  021312                                      CKLOOP                     ;CHECK IF /FL:LOE IS SET
     021312  104006                              EMT     C$CLP1
350
351  021314  004537  013646                      JSR     R5,WTDRDY          ;WAIT FOR DRIVE READY
352  021320                             87$:     CKLOOP                     ;CHECK IF /FL:LOE IS SET
     021320  104006                              EMT     C$CLP1
353
354  021322  004537  012602                      JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
355  021326                                      CKLOOP                     ;CHECK IF /FL:LOE IS SET
     021326  104006                              EMT     C$CLP1
356
357  021330  004537  013102                      JSR     R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
358  021334  000010                              RDHDR                      ;READ HEADER
359
```

```
021336  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
021342                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
021342  104006                          EMT     C$CLP1

021344  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
021350                                  ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
021350  104010                          EMT     C$ESCAPE
021352  000106                          .WORD   10000$-.

021354  011337  002240                  MOV     (R3),GDDAT      ;GET EXPECTED CYLINDER
021360  011337  002254          8$:     MOV     (R3),DWORD      ;SET UP DIFFERENCE FOR SEEK
021364  013737  002174  002242          MOV     E.MP,BDDAT      ;READ HEADER FROM RLMP
021372  043737  002212  002242          BIC     SECMSK,BDDAT    ;CLEAR OUT SECTOR BITS
021400  023737  002240  002242          CMP     GDDAT,BDDAT     ;DID SEEK GO TO THE RIGHT
021406  001404                          BEQ     9$              ;TRACK, IF SO, GO GET NEXT

021410                                  ERRDF   44.,EM54,ERR3
021410  104462                          TRAP    T$ERCODE
021412  000054                          .WORD   44
021414  006343                          .WORD   EM54
021416  010170                          .WORD   ERR3
021420                          9$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
021420  104006                          EMT     C$CLP1

021422  005723                          TST     (R3)+           ;BUMP PATTERN
021424  023727  002264  000001          CMP     T.DRIVE,#1
021432  001005                          BNE     2$
021434  020327  002602                  CMP     R3,#SKFND
021440  001407                          BEQ     10$
021442  000137  021054                  JMP     1$

021446  020327  002644          2$:     CMP     R3,#SKEEND
021452  001402                          BEQ     10$
021454  000137  021054                  JMP     1$

021460                          10$:

021460                          ENDSEG                          ;****END OF SEGMENT****
021460                          10000$:
021460  104005                          EMT     C$ESEG
021462                          ENDTST                          ;****END OF TEST****
021462                          L10063:
021462  104001                          EMT     C$ETST



                                .SBTTL  **TEST 38** - VERIFY HEAD SELECT 0 VIA RD HDR

021464                          BGNTST                          ;****START OF TEST****

                                ;

021464                          STARS
                                ;;*************************************************************
                                ;CHECK THAT WE CAN SELECT HEAD SELECT ZERO.  ISSUE
                                ;SEEK TO HEAD SELECT 0 AND VERIFY WITH READ HEADER.
021464                          STARS
                                ;;*************************************************************
```

```

021464  012777  000001  160446  99$:    MOV     #MK,@RLDA       ;SET MARKER IN RLDA
021472  005037  002240                  CLR     GDDAT           ;SET EXPECTED
                                                                ;LOAD HS=0 INTO RLDA
021476                          2$:
021476  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
021502  000006                          SEEK                    ;SEEK
021504  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
021510                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
021510  104006                          EMT     C$CLP1

021512  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
021516                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
021516  104006                          EMT     C$CLP1

021520  004537  013646                  JSR     R5,WTDRDY       ;WAIT FOR DRIVE READY
021524                          89$:    CKLOOP                  ;CHECK IF /FL:LOE IS SET
021524  104006                          EMT     C$CLP1

021526  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
021532                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
021532  104006                          EMT     C$CLP1

021534  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
021540  000010                          RDHDR                   ;READ HEADER
021542  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
021546                          96$:    CKLOOP                  ;CHECK IF /FL:LOE IS SET
021546  104006                          EMT     C$CLP1

021550  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
021554                                  ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
021554  104010                          EMT     C$ESCAPE
021556  000036                          .WORD   L10064-.

021560  013737  002174  002242          MOV     E.MP,BDDAT      ;READ HEADER FOR HEAD SELECT
021566  042737  177677  002242          BIC     #177677,BDDAT   ;MASK ONLY HEAD SELECT
021574  023737  002240  002242          CMP     GDDAT,BDDAT     ;COMPARE HEAD SELECTS
021602  001404                          BEQ     5$              ;IF EQUAL CONTINUE

021604                                  ERRDF   45.,EM55,ERR4
021604  104462                          TRAP    T$ERCODE
021606  000055                          .WORD   45
021610  006402                          .WORD   EM55
021612  010242                          .WORD   ERR4
021614                          5$:

021614                          ENDTST                          ;****END OF TEST****
021614                          L10064:
021614  104001                          EMT     C$ETST


                                .SBTTL  **TEST 39** - VERIFY HEAD SELECT 1 VIA RD HDR

021616                          BGNTST                          ;****START OF TEST****


021616                          STARS
```

```
                                ;;**************************************************************
                                ;CHECK THAT WE CAN SELECT HEAD SELECT ONE.  ISSUE
                                ;SEEK TO HEAD SELECT 1 AND VERIFY WITH READ HEADER.
021616                          STARS
                                ;;*****************************/********************************


021616  012777  000001  160314  99$:    MOV     #MK,@RLDA         ;SET MARKER IN RLDA
021624  052777  000020  160306          BIS     #DAHS,@RLDA       ;LOAD HS=1 INTO RLDA
021632  004537  013102          2$:     JSR     R5,LDFUNC         ;ISSUE FUNCTION OF FOLLOWING WORD
021636  000006                          SEEK                      ;SEEK
021640  004537  013712                  JSR     R5,WTCRDY         ;WAIT FOR CONTROLLER READY HIGH
021644                                  CKLOOP                    ;CHECK IF /FL:LOE IS SET
021644  104006                          EMT     C$CLP1

021646  004537  012602                  JSR     R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
021652                                  CKLOOP                    ;CHECK IF /FL:LOE IS SET
021652  104006                          EMT     C$CLP1

021654  004537  013646                  JSR     R5,WTDRDY         ;WAIT FOR DRIVE CLEAR
021660                          89$:    CKLOOP                    ;CHECK IF /FL:LOE IS SET
021660  104006                          EMT     C$CLP1

021662  004537  012602                  JSR     R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
021666                                  CKLOOP                    ;CHECK IF /FL:LOE IS SET
021666  104006                          EMT     C$CLP1

021670  004537  013102                  JSR     R5,LDFUNC         ;ISSUE FUNCTION OF FOLLOWING WORD
021674  000010                          RDHDR                     ;READ HEADER
021676  004537  013712                  JSR     R5,WTCRDY         ;WAIT FOR CONTROLLER READY HIGH
021702                                  CKLOOP                    ;CHECK IF /FL:LOE IS SET
021702  104006                          EMT     C$CLP1

021704  004537  012602                  JSR     R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
021710                                  ESCAPE  TST               ;IF /FL:LOE SET LOOP, ELSE EXIT TST
021710  104010                          EMT     C$ESCAPE
021712  000044                          .WORD   L10065-.

021714  013737  002174  002242          MOV     E.MP,BDDAT        ;READ HEADER
021722  042737  177677  002242          BIC     #177677,BDDAT     ;MASK FOR H.S.
021730  012737  000100  002240          MOV     #RHHS,GDDAT       ;SET EXPECTED
021736  023737  002240  002242          CMP     GDDAT,BDDAT       ;CORRECT HEAD
021744  001404                          BEQ     5$                ;YES, CONTINUE

021746                                  ERRDF   46.,EM55,ERR4
021746  104462                          TRAP    T$ERCODE
021750  000056                          .WORD   46
021752  006402                          .WORD   EM55
021754  010242                          .WORD   ERR4
021756                          5$:

021756                          ENDTST                            ;****END OF TEST****
021756                          L10065:
021756  104001                          EMT     C$ETST


                                .SBTTL  **TEST 40** - VERIFY HEAD SELECT 0 VIA GET STATUS
```

```

021760                          BGNTST                                  ;****START OF TEST****

021760                          STARS
                                ;;**************************************************************
                                ;CHECK THAT WE CAN READ BACK HEAD SELECT 0 WITH
                                ;A GET STATUS FUNCTION.  SELECT H.S. 0 WITH A SEEK
                                ;VERIFY WITH GET STATUS
021760                          STARS
                                ;;**************************************************************

021760  012777  000001  160152          MOV     #MK,@RLDA       ;SET MARKER IN RLDA
                                                                ;LOAD HS=0 INTO RLDA
021766  005037  002240          2$:     CLR     GDDAT           ;SET UP EXP'D
021772  004537  013102          3$:     JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
021776  000006                          SEEK                    ;SEEK
022000  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
022004                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
022004  104006                          EMT     C$CLP1

022006  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
022012                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
022012  104006                          EMT     C$CLP1

022014  004537  013646                  JSR     R5,WTDRDY       ;WAIT FOR DRIVE READY
022020                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
022020  104006                          EMT     C$CLP1

022022  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
022026                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
022026  104006                          EMT     C$CLP1

022030  012777  000003  160102          MOV     #GSBIT!MK,@RLDA ;SET UP FOR GET STATUS IN DA
022036  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
022042  000004                          GSTAT                   ;GET STATUS
022044  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
022050                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
022050  104006                          EMT     C$CLP1

022052  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
022056                                  ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
022056  104010                          EMT     C$ESCAPE
022060  000036                          .WORD   L10066-.

022062  013737  002174  002242          MOV     E.MP,BDDAT      ;READ STATUS FOR HEAD SELECT BIT
022070  042737  177677  002242          BIC     #177677,BDDAT   ;LEAVE ONLY H.S. BIT
022076  023737  002240  002242          CMP     GDDAT,BDDAT     ;IS HEAD SELECT CORRECT?
022104  001404                          BEQ     6$              ;YES, CONTINUE

022106                                  ERRDF   47.,EM56,ERR4
022106  104462                          TRAP    T$ERCODE
022110  000057                          .WORD   47
022112  006435                          .WORD   EM56
022114  010242                          .WORD   ERR4
022116                          6$:

022116                          ENDTST                                  ;****END OF TEST****
```

```
     022116                             L10066:
     022116  104001                             EMT     C$ETST
 533
 534
 535                                    .SBTTL  **TEST 41** - VERIFY HEAD SELECT 1 VIA GET STATUS
 536
 537 022120                             BGNTST                          ;****START OF TEST****
 538
 539 022120                             STARS
                                        ;;*************************************************************
 540                                    ;CHECK THAT WE CAN READ BACK HEAD SELECT 1 WITH A GET
 541                                    ;STATUS FUNCTION.  SELECT H.S. 1 WITH A SEEK AND VERIFIY WITH
 542                                    ;GET STATUS
 543 022120                             STARS
                                        ;;*************************************************************
 544
 545
 546 022120  012777  000001  160012             MOV     #MK,@RLDA       ;SET MARKER IN RLDA
 547 022126  052777  000020  160004             BIS     #DAHS,@RLDA     ;LOAD HS=1 INTO RLDA
 548 022134  012737  000100  002240     2$:     MOV     #STHS,GDDAT     ;SET UP EXP'D
 549 022142  004537  013102             3$:     JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
 550 022146  000006                             SEEK                    ;SEEK
 551 022150  004537  013712                     JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
 552 022154                                     CKLOOP                  ;CHECK IF /FL:LOE IS SET
     022154  104006                             EMT     C$CLP1
 553
 554 022156  004537  012602                     JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
 555 022162                                     CKLOOP                  ;CHECK IF /FL:LOE IS SET
     022162  104006                             EMT     C$CLP1
 556
 557 022164  004537  013646                     JSR     R5,WTDRDY       ;WAIT FOR DRIVE READY
 558 022170                                     CKLOOP                  ;CHECK IF /FL:LOE IS SET
     022170  104006                             EMT     C$CLP1
 559
 560 022172  004537  012602                     JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
 561 022176                                     CKLOOP                  ;CHECK IF /FL:LOE IS SET
     022176  104006                             EMT     C$CLP1
 562
 563 022200  012777  000003  157732             MOV     #GSBIT!MK,@RLDA ;SET UP FOR GET STATUS IN DA
 564 022206  004537  013102                     JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
 565 022212  000004                             GSTAT                   ;GET STATUS
 566 022214  004537  013712                     JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
 567 022220                                     ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
     022220  104010                             EMT     C$ESCAPE
     022222  000046                             .WORD   L10067-.
 568
 569 022224  004537  012602                     JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
 570 022230                                     ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
     022230  104010                             EMT     C$ESCAPE
     022232  000036                             .WORD   L10067-.
 571
 572 022234  013737  002174  002242             MOV     E.MP,BDDAT      ;READ STATUS FOR HEAD SELECT BIT
 573 022242  042737  177677  002242             BIC     #177677,BDDAT   ;LEAVE ONLY H.S. BIT
 574 022250  023737  002240  002242             CMP     GDDAT,BDDAT     ;IS HEAD SELECT CORRECT?
 575 022256  001404                             BEQ     6$              ;YES, CONTINUE
 576
 577 022260                                     ERRDF   48.,EM56,ERR4
```

```
022260  104462                                  TRAP    T$ERCODE
022262  000060                                  .WORD   48
022264  006435                                  .WORD   EM56
022266  010242                                  .WORD   ERR4
022270                                  6$:

022270                                  ENDTST                          ;****END OF TEST****
022270                                  L10067:
022270  104001                                  EMT     C$ETST



                                        .SBTTL  **TEST 42** - TEST TIME AT WHICH DIF WD GETS TRANSMITTED

022272                                  BGNTST                          ;****START OF TEST****


022272                                  STARS
                                        ;;*************************************************************
                                        ;VERIFY THAT THE DIFFERENCE WORD ON A SEEK IS
                                        ;TRANSMITTED PRIOR TO CONTROLLER READY SETTING.  THIS
                                        ;IS DONE BY SETTING A KNOWN DIFFERENCE WORD IN
                                        ;THE RLDA ISSUING A A SEEK, WAITING FOR CONTROLLER READY
                                        ;(BUT NOT DRIVE READY), WRITING A DIFFERENT RLDA AND WAITING
                                        ;FOR DRIVE READY.  THE RESULTANT POSITION SHOULD BE THAT
                                        ;OF THE FIRST RLDA ONLY.
022272                                  STARS
                                        ;;*************************************************************


022272  004537  013102                          JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
022276  000010                                  RDHDR                   ;READ HEADER
022300  004537  013712                          JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
022304                                  99$:    CKLOOP                  ;CHECK IF /FL:LOE IS SET
022304  104006                                  EMT     C$CLP1

022306  004537  012602                          JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
022312                                          CKLOOP                  ;CHECK IF /FL:LOE IS SET
022312  104006                                  EMT     C$CLP1

022314  013737  002174  002240                  MOV     E.MP,GDDAT      ;READ HEADER
022322  043737  002212  002240                  BIC     SECMSK,GDDAT    ;CLEAR SECTOR BITS
022330  012777  000001  157602                  MOV     #MK,@RLDA       ;SET MARKER IN RLDA
022336  032737  000100  002240                  BIT     #RHHS,GDDAT     ;TEST H.S.
022344  001403                                  BEQ     2$              ;IF ZERO, CONTINUE
022346  052777  000020  157564                  BIS     #DAHS,@RLDA     ;ONE, SET SO WE WILL REMAIN THERE
022354  013737  002240  002232          2$:     MOV     GDDAT,TMPO      ;STORE HEADER
022362  042737  000100  002232                  BIC     #RHHS,TMPO      ;CLEAR H.S. FROM STORED WORD
022370  023727  002264  000001                  CMP     T.DRIVE,#1
022376  001034                                  BNE     12$
022400  023737  002232  002560                  CMP     TMPO,HALMAX
022406  101007                                  BHI     3$
022410  052777  000004  157522                  BIS     #SIGN,@RLDA
022416  063737  002556  002240                  ADD     QUAMAX,GDDAT
022424  000403                                  BR      4$
022426  163737  002556  002240          3$:     SUB     QUAMAX,GDDAT
022434  053777  002556  157476          4$:     BIS     QUAMAX,@RLDA
022442  012737  000001  002234                  MOV     #MK,TMP1
```

```
022450   032777   000020   157462            BIT     #DAHS,@RLDA
022456   001037                              BNE     5$
022460   052737   000020   002234            BIS     #DAHS,TMP1
022466   000433                              BR      5$
022470   023737   002232   002610   12$:     CMP     TMP0,HMAX
022476   101007                              BHI     13$
022500   052777   000004   157432            BIS     #SIGN,@RLDA
022506   063737   002606   002240            ADD     QMAX,GDDAT
022514   000403                              BR      14$
022516   163737   002606   002240   13$:     SUB     QMAX,GDDAT
022524   053777   002606   157406   14$:     BIS     QMAX,@RLDA
022532   012737   000001   002234            MOV     #MK,TMP1
022540   032777   000020   157372            BIT     #DAHS,@RLDA
022546   001003                              BNE     5$
022550   052737   000020   002234            BIS     #DAHS,TMP1
022556   004537   013102            5$:      JSR     R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
022562   000006                              SEEK                       ;SEEK
022564   004537   013712                     JSR     R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
022570                                       CKLOOP                     ;CHECK IF /FL:LOE IS SET
022570   104006                              EMT     C$CLP1


022572   004537   012602                     JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
022576                                       CKLOOP                     ;CHECK IF /FL:LOE IS SET
022576   104006                              EMT     C$CLP1

022600   013777   002234   157332            MOV     TMP1,@RLDA         ;SEND IN NEW DIFFERENCE WORD
022606   004537   013712                     JSR     R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
022612                                       CKLOOP                     ;CHECK IF /FL:LOE IS SET
022612   104006                              EMT     C$CLP1

022614   004537   012602                     JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
022620                                       CKLOOP                     ;CHECK IF /FL:LOE IS SET
022620   104006                              EMT     C$CLP1

022622   004537   013646                     JSR     R5,WTDRDY          ;WAIT FOR DRIVE READY
022626                              8$:      CKLOOP                     ;CHECK IF /FL:LOE IS SET
022626   104006                              EMT     C$CLP1


022630   004537   012602                     JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
022634                                       CKLOOP                     ;CHECK IF /FL:LOE IS SET
022634   104006                              EMT     C$CLP1

022636   004537   013102                     JSR     R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
022642   000010                              RDHDR                      ;READ HEADER
022644   004537   013712                     JSR     R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
022650                                       CKLOOP                     ;CHECK IF /FL:LOE IS SET
022650   104006                              EMT     C$CLP1

022652   004537   012602                     JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
022656                                       ESCAPE  TST                ;IF /FL:LOE SET LOOP, ELSE EXIT TST
022656   104010                              EMT     C$ESCAPE
022660   000036                              .WORD   L10070-.

022662   013737   002174   002242            MOV     E.MP,BDDAT         ;READ HEADER
022670   043737   002212   002242            BIC     SECMSK,BDDAT       ;CLEAR SECTOR ADDRESS
```

```
022676  023737  002240  002242                 CMP     GDDAT,BDDAT         ;IS HEADER CORRECT?
022704  001404                                 BEQ     10$                 ;IF SO BRANCH

022706                                         ERRDF   50.,EM57,ERR4
022706  104462                                 TRAP    T$ERCODE
022710  000062                                 .WORD   50
022712  006474                                 .WORD   EM57
022714  010242                                 .WORD   ERR4
022716                                 10$:

022716                                 ENDTST                              ;****END OF TEST****
022716                                 L10070:
022716  104001                                 EMT     C$ETST



                                       .SBTTL  **TEST 43** - EXTENSIVE CHECK OF HEADER CRC

022720                                 BGNTST                              ;****START OF TEST****
022720                                 STARS
                                       ;;**************************************************************
                                       ;MORE EXTENSIVE CHECK OF HEADER CRC.  WE WILL SEEK
                                       ;AND READ HEADERS VERIFYING HDR CRC ACROSS THE
                                       ;PLATTER USING THE GROWING 0, GROWING 1, SHIFTING 0 AND
                                       ;GROWING 0 PATTERNS FOR TRACK ADDRESSES.
022720                                 STARS
                                       ;;**************************************************************


022720  012703  002502                         MOV     #SKLST,R3           ;GET LIST OF DIFFERENCE WORDS
022724                                 BGNSEG                              ;****START OF SEGMENT****
022724  104004                                 EMT     C$BSEG
022726                                 1$:
022726  004537  013102                         JSR     R5,LDFUNC           ;ISSUE FUNCTION OF FOLLOWING WORD
022732  000010                                 RDHDR                       ;READ HEADER
022734  004537  013712                         JSR     R5,WTCRDY           ;WAIT FOR CONTROLLER READY HIGH
022740                                 98$:    CKLOOP                      ;CHECK IF /FL:LOE IS SET
022740  104006                                 EMT     C$CLP1

022742  004537  012602                         JSR     R5,CHERR            ;CHECK CONTROLLER FOR ERRORS
022746                                         CKLOOP                      ;CHECK IF /FL:LOE IS SET
022746  104006                                 EMT     C$CLP1

022750  013737  002174  002242                 MOV     E.MP,BDDAT          ;READ HEADER
022756  043737  002212  002242                 BIC     SECMSK,BDDAT        ;CLEAR OUT SECTOR
022764  001461                                 BEQ     5$                  ;IF ON TRACK ZERO, H.S. ZERO, OK

                                       ;NOT ON TRACK ZERO CALCULATE DIFFERENCE WORD AND PUT IT BACK
                                       ;ON ZERO.

022766  042737  000100  002242                 BIC     #RHHS,BDDAT         ;CLEAR OUT HEAD SELECT
022774  013777  002242  157136                 MOV     BDDAT,@RLDA         ;PUT CYLINDER AS DIFFERENCE WORD
023002  052777  000001  157130                 BIS     #MK,@RLDA           ;SET MARKER BIT
023010  004537  013102                         JSR     R5,LDFUNC           ;ISSUE FUNCTION OF FOLLOWING WORD
023014  000006                                 SEEK                        ;SEEK
023016  004537  013712                         JSR     R5,WTCRDY           ;WAIT FOR CONTROLLER READY HIGH
023022                                         CKLOOP                      ;CHECK IF /FL:LOE IS SET
023022  104006                                 EMT     C$CLP1
```

```

023024  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
023030                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
023030  104006                          EMT     C$CLP1

023032  004537  013646                  JSR     R5,WTDRDY       ;WAIT FOR DRIVE READY
023036                          89$:    CKLOOP                  ;CHECK IF /FL:LOE IS SET
023036  104006                          EMT     C$CLP1

023040  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
023044                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
023044  104006                          EMT     C$CLP1


023046  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
023052  000010                          RDHDR                   ;READ HEADER
023054  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
023060                          96$:    CKLOOP                  ;CHECK IF /FL:LOE IS SET
023060  104006                          EMT     C$CLP1

023062  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
023066                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
023066  104006                          EMT     C$CLP1

023070  005037  002240                  CLR     GDDAT           ;CLEAR EXPECTED
023074  013737  002242  002254          MOV     BDDAT,DWORD     ;SAVE DIFFERENCE WORD
023102  013737  002174  002242          MOV     E.MP,BDDAT      ;READ HEADER
023110  043737  002212  002242          BIC     SECMSK,BDDAT    ;MASK OUT SECTOR BITS
023116  001404                          BEQ     5$              ;BRANCH IF ON ZERO TRACK

023120                                  ERRDF   51,,EM54,ERR3
023120  104462                          TRAP    T$ERCODE
023122  000063                          .WORD   51
023124  006343                          .WORD   EM54
023126  010170                          .WORD   ERR3
023130                          5$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
023130  104006                          EMT     C$CLP1

023132  011377  157002                  MOV     (R3),@RLDA      ;GET DIFFERENCE WORD
023136  052777  000005  156774          BIS     #SIGN!MK,@RLDA  ;SET SIGN (TOWARDS SPINDLE) AND MARKER
023144  004537  013102                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
023150  000006                          SEEK                    ;SEEK
023152  004537  013712                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
023156                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
023156  104006                          EMT     C$CLP1

023160  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
023164                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
023164  104006                          EMT     C$CLP1

023166  004537  013646                  JSR     R5,WTDRDY       ;WAIT FOR DRIVE READY
023172                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
023172  104006                          EMT     C$CLP1


023174  004537  012602                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
023200                                  CKLOOP                  ;CHECK IF /FL:LOE IS SET
```

```
     023200  104006                              EMT     C$CLP1

     023202  004537  013102                      JSR     R5,LDFUNC         ;ISSUE FUNCTION OF FOLLOWING WORD
     023206  000010                              RDHDR                     ;READ HEADER
     023210  004537  013712                      JSR     R5,WTCRDY         ;WAIT FOR CONTROLLER READY HIGH
     023214                                      CKLOOP                    ;CHECK IF /FL:LOE IS SET
     023214  104006                              EMT     C$CLP1


     023216  004537  012602                      JSR     R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
     023222                                      CKLOOP                    ;CHECK IF /FL:LOE IS SET
     023222  104006                              EMT     C$CLP1

     023224  011337  002240                      MOV     (R3),GDDAT        ;GET EXPECTED CYLINDER
     023230  011337  002254          8$:         MOV     (R3),DWORD        ;SET UP DIFFERENCE FOR SEEK
     023234  013737  002174  002242              MOV     E.MP,BDDAT        ;READ HEADER FROM RLMP
     023242  043737  002212  002242              BIC     SECMSK,BDDAT      ;CLEAR OUT SECTOR BITS
     023250  023737  002240  002242              CMP     GDDAT,BDDAT       ;DID SEEK GO TO THE RIGHT
     023256  001404                              BEQ     9$                ;TRACK, IF SO, GO GET NEXT

     023260                                      ERRDF   52.,EM54,ERR3
     023260  104462                              TRAP    T$ERCODE
     023262  000064                              .WORD   52
     023264  006343                              .WORD   EM54
     023266  010170                              .WORD   ERR3
     023270                          9$:         CKLOOP                    ;CHECK IF /FL:LOE IS SET
     023270  104006                              EMT     C$CLP1

     023272  013737  002174  023306              MOV     E.MP,10$          ;GET HEADER WORD
     023300  004537  013460                      JSR     R5,SIMBCC         ;GO CALCULATE HEADER CRC
     023304  000020                              16.                       ;16 BITS
     023306  000000                  10$:        .WORD   0                 ;HEADER GOES HERE
     023310  000000                              .WORD   0                 ;START WITH ZERO CRC
     023312  013737  002222  023336              MOV     CALBCC,20$
     023320  013737  002176  023334              MOV     E.MP1,21$
     023326  004537  013460                      JSR     R5,SIMBCC
     023332  000020                              16.
     023334  000000                  21$:        .WORD   0
     023336  000000                  20$:        .WORD   0
     023340  013737  002222  002240              MOV     CALBCC,GDDAT      ;MOVE CALCULATED CRC TO GDDAT
     023346  013737  002200  002242              MOV     E.MP2,BDDAT       ;GET HEADER CRC FROM RLMP
     023354  023737  002240  002242              CMP     GDDAT,BDDAT       ;IS CRC CORRECT?
     023362  001404                              BEQ     11$               ;IF SO CONTINUE

     023364                                      ERRDF   53.,EM42,ERR4
     023364  104462                              TRAP    T$ERCODE
     023366  000065                              .WORD   53
     023370  005764                              .WORD   EM42
     023372  010242                              .WORD   ERR4
     023374                          11$:        CKLOOP                    ;CHECK IF /FL:LOE IS SET
     023374  104006                              EMT     C$CLP1


     023376  005723                              TST     (R3)+             ;BUMP PATTERN
     023400  023727  002264  000001              CMP     T.DRIVE,#1
     023406  001005                              BNE     2$
     023410  020327  002602                      CMP     R3,#S$END
```

```
    806 023414  001407                            BEQ     12$
    807 023416  000137  022726                    JMP     1$
    808 023422  020327  002644          2$:       CMP     R3,#SKEEND
    809 023426  001402                            BEQ     12$
    810 023430  000137  022726                    JMP     1$
    811 023434                          12$:
    812
    813 023434                          ENDSEG                            ;****END OF SEGMENT****
        023434                          10000$:
        023434  104005                            EMT     C$ESEG
    814 023436                          ENDTST                            ;****END OF TEST****
        023436                          L10071:
        023436  104001                            EMT     C$ETST
    815
    816
    817                                 .SBTTL  **TEST 44** - VERIFY GET STATUS WHILE DRDY IS LOW
    818
    819 023440                          BGNTST                            ;****START OF TEST****
    820
    821 023440                          STARS
                                        ;;*************************************************************
    822                                 ;VERIFY THAT WE CAN ISSUE GET STATUS AND RECIEVE
    823                                 ;THE STATUS WORD WHILE THE DRIVE IS IN NOTION SEEKING
    824 023440                          STARS
                                        ;;*************************************************************
    825
    826
    827 023440                          1$:
    828 023440  004537  013102                    JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
    829 023444  000010                            RDHDR                   ;READ HEADER
    830 023446  004537  013712                    JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
    831 023452                                    CKLOOP                  ;CHECK IF /FL:LOE IS SET
        023452  104006                            EMT     C$CLP1
    832
    833 023454  004537  012602                    JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
    834 023460                                    CKLOOP                  ;CHECK IF /FL:LOE IS SET
        023460  104006                            EMT     C$CLP1
    835
    836 023462  013737  002174  002242            MOV     E.MP,BDDAT      ;READ HEADER
    837 023470  043737  002212  002242            BIC     SECMSK,BDDAT    ;CLEAR OUT SECTOR
    838 023476  001461                            BEQ     5$              ;IF ON TRACK ZERO, H.S. ZERO, OK
    839
    840                                 ;NOT ON TRACK ZERO CALCULATE DIFFERENCE WORD AND PUT IT BACK
    841                                 ;ON ZERO.
    842
    843 023500  042737  000100  002242            BIC     #RHHS,BDDAT     ;CLEAR OUT HEAD SELECT
    844 023506  013777  002242  156424            MOV     BDDAT,@RLDA     ;PUT CYLINDER AS DIFFERENCE WORD
    845 023514  052777  000001  156416            BIS     #MK,@RLDA       ;SET MARKER BIT
    846 023522  004537  013102                    JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
    847 023526  000006                            SEEK                    ;SEEK
    848 023530  004537  013712                    JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
    849 023534                                    CKLOOP                  ;CHECK IF /FL:LOE IS SET
        023534  104006                            EMT     C$CLP1
    850
    851 023536  004537  012602                    JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
    852 023542                                    CKLOOP                  ;CHECK IF /FL:LOE IS SET
        023542  104006                            EMT     C$CLP1
    853
    854 023544  004537  013646                    JSR     R5,WTDRDY        ;WAIT FOR DRIVE READY
    855 023550                                    CKLOOP                   ;CHECK IF /FL:LOE IS SET
        023550  104006                            EMT     C$CLP1
    856
    857 023552  004537  012602                    JSR     R5,CHERR         ;CHFCK CONTROLLER FOR FRRORS
    858 023556                                    CKLOOP                   ;CHECK IF /FL:LOE IS SET
        023556  104006                            EMT     C$CLP1
    859
    860
    861 023560  004537  013102                    JSR     R5,LDFUNC        ;ISSUE FUNCTION OF FOLLOWING WORD
    862 023564  000010                            RDHDR                    ;READ HEADER
    863 023566  004537  013712                    JSR     R5,WTCRDY        ;WAIT FOR CONTROLLER READY HIGH
    864 023572                                    CKLOOP                   ;CHECK IF /FL:LOE IS SET
        023572  104006                            EMT     C$CLP1
    865
    866 023574  004537  012602                    JSR     R5,CHERR         ;CHECK CONTROLLER FOR ERRORS
    867 023600                                    CKLOOP                   ;CHECK IF /FL:LOE IS SET
        023600  104006                            EMT     C$CLP1
    868
    869 023602  005037  002240                    CLR     GDDAT            ;CLEAR EXPECTED
    870 023606  013737  002242  002254            MOV     BDDAT,DWORD      ;SAVE DIFFERENCE WORD
    871 023614  013737  002174  002242            MOV     E.MP,BDDAT       ;READ HEADER
    872 023622  043737  002212  002242            BIC     SECMSK,BDDAT     ;MASK OUT SECTOR BITS
    873 023630  001404                            BEQ     5$               ;BRANCH IF ON ZERO TRACK
    874
    875 023632                                    ERRDF   54.,EM54,ERR3
        023632  104462                            TRAP    T$ERCODE
        023634  000066                            .WORD   54
        023636  006343                            .WORD   EM54
        023640  010170                            .WORD   ERR3
    876 023642                          5$:       CKLOOP                   ;CHECK IF /FL:LOE IS SET
        023642  104006                            EMT     C$CLP1
    877
    878 023644  012777  077601  156266            MOV     #77601,@RLDA     ;GET DIFFERENCE WORD
    879 023652  052777  000005  156260            BIS     #SIGN.MK,@RLDA   ;SET SIGN (TOWARDS SPINDLE) AND MARKER
    880 023660  004537  013102                    JSR     R5,LDFUNC        ;ISSUE FUNCTION OF FOLLOWING WORD
    881 023664  000006                            SEEK                     ;SEEK
    882 023666  004537  013712                    JSR     R5,WTCRDY        ;WAIT FOR CONTROLLER READY HIGH
    883 023672                                    CKLOOP                   ;CHECK IF /FL:LOE IS SET
        023672  104006                            EMT     C$CLP1
    884
    885
    886 023674  004537  012602                    JSR     R5,CHERR         ;CHECK CONTROLLER FOR ERPORS
    887 023700                                    CKLOOP                   ;CHECK IF /FL:LOE IS SET
        023700  104006                            EMT     C$CLP1
    888 023702  012777  000003  156230            MOV     #MK!GSBIT,@RLDA
    889 023710  004537  013102                    JSR     R5,LDFUNC        ;ISSUE FUNCTION OF FOLLOWING WORD
    890 023714  000004                            GSTAT
    891 023716  004537  013712                    JSR     R5,WTCRDY        ;WAIT FOR CONTROLLER READY HIGH
    892 023722                                    CKLOOP                   ;CHECK IF /FL:LOE IS SET
        023722  104006                            EMT     C$CLP1
    893 023724  004537  012602                    JSR     R5,CHERR         ;CHECK CONTROLLER FOR ERRORS
    894
    895 023730                          ENDTST                             ;****END OF TEST****
        023730                          L10072:
        023730  104001                            EMT     C$ETST
```

```

023732                                  BGNMOD  HRDPRM

023732                                          BGNHRD
023732  000030                                  .WORD L10073-L$HARD/2

023734                                          GPRML   CNTMSG,CNT,1,YES
023734  005130                                  .WORD   T$CODE
023736  024030                                  .WORD   CNTMSG
023740  000001                                  .WORD   1
023742                                          GPRMA   CSRMSG,CSR,0,160000,177776,YES
023742  000031                                  .WORD   T$CODE
023744  024014                                  .WORD   CSRMSG
023746  160000                                  .WORD   T$LOLIM
023750  177776                                  .WORD   T$HILIM
023752                                          GPRMA   VECMSG,VECT,0,0,776,YES
023752  001031                                  .WORD   T$CODE
023754  024046                                  .WORD   VECMSG
023756  000000                                  .WORD   T$LOLIM
023760  000776                                  .WORD   T$HILIM
023762                                          GPRMD   BRMSG,PRIOR,0,340,0,7,YES
023762  002032                                  .WORD   T$CODE
023764  024035                                  .WORD   BRMSG
023766  000340                                  .WORD   340
023770  000000                                  .WORD   T$LOLIM
023772  000007                                  .WORD   T$HILIM
023774                                          GPRML   DRTYPE,TYPDR,1,YES
023774  003130                                  .WORD   T$CODE
023776  024055                                  .WORD   DRTYPE
024000  00000'                                  .WORD   1
024002                                          GPRMD   DRMSG,DRBT,0,03400,0,7,YES
024002  004032                                  .WORD   T$CODE
024004  024077                                  .WORD   DRMSG
024006  003400                                  .WORD   03400
024010  000000                                  .WORD   T$LOLIM
024012  000007                                  .WORD   T$HILIM

024014                                          ENDHRD
                                                .EVEN
024014                                  L10073:

024014     102     125     123          CSRMSG: .ASCIZ  /BUS ADDRESS/
024017     040     101     104
024022     104     122     105
024025     123     123     000
024030     122     114     061          CNTMSG: .ASCIZ  /RL11/
024033     061     000
024035     102     122     040          BRMSG:  .ASCIZ  /BR LEVEL/
024040     114     105     126
024043     105     114     000
024046     126     105     103          VECMSG: .ASCIZ  /VECTOR/
024051     124     117     122
024054     000
024055     104     122     111          DRTYPE: .ASCIZ  /DRIVE TYPE - RL01/
024060     126     105     040
024063     124     131     120
024066     105     040     075
```

```
      024071      040      122      114
      024074      060      061      000
  915 024077      104      122      111  DRMSG:   .ASCIZ  /DRIVE/
      024102      126      105      000
  916                                    .EVEN
  917
  918 024106                                      ENDMOD
  919
  920
  921
  922 024106                             BGNMOD   SFTPRM
  923
  924 024106                                      BGNSFT
      024106  000014                              .WORD L10074-L$SOFT/2
  925 024110                                      GPRML    DMSG,DLT,1,YES
      024110  000130                              .WORD    T$CODE
      024112  024140                              .WORD    DMSG
      024114  000001                              .WORD    1
  926 024116                                      XFERF    1$
      024116  006044                              .WORD    T$CODE
  927 024120                                      GPRMD    EMSG,ELT,0,177777,0,177777,YES
      024120  001032                              .WORD    T$CODE
      024122  024175                              .WORD    EMSG
      024124  177777                              .WORD    177777
      024126  000000                              .WORD    T$LOLIM
      024130  177777                              .WORD    T$HILIM
  928 024132                             1$:      GPRML    SMSG,SIZE,1,YES
      024132  002130                              .WORD    T$CODE
      024134  024164                              .WORD    SMSG
      024136  000001                              .WORD    1
  929 024140                                      ENDSFT
                                                  .EVEN
      024140                             L10074:
  930
  934
  935 024140      104      122      117  DMSG:    .ASCIZ   /DROP ON ERROR LIMIT/
  936 024164      101      125      124  SMSG:    .ASCIZ   /AUTOSIZE/
  937 024175      105      122      122  EMSG:    .ASCIZ   /ERROR LIMIT/
  938
  942
  943                                    .EVEN
  944
  945 024212                                      ENDMOD
  946         024514                     .=24514           ;THIS FIXES THE 'APT' MAILBOX ADDRESS
  947 024514                             LASTAD
                                                  .EVEN
      024514                             L$LAST::
  948
```

```
      1                                           .SBTTL  DIAGNOSTIC SUPERVISOR -- LOW CORE SET UP
```

```
     35 055310  000000                        .WORD    0                ;SPACE FOR USER POOL POINTER
     36 055312  000000                        .WORD    0                ;SIZE
     37 055314  000000                        .WORD    0                ;CHECKSUM (NOT CURRENTLY USED)
     38 055316  000000                        .WORD    0                ;SIZE OF H.W. PTAB. ALLOCATION
     39         055322                        END.SUPV=.+2
     40         000200                        .END 200
```

```
ABOFLA  025040 G    BLD.HW  032202      CURR.S  024522 G    C$SVEC= 000037      EF09  = 000011 G
ABOPAS  024756 G    BLOCK   047614      CURR.T  024524 G    C$TPRI= 000013      EF10  = 000012 G
ABO.FM  027320      BPRIOR  002146      CYLMSK  002246      C$UNBU= 000031      EF11  = 000013 G
ADDCOD  012512 G    BRMSG   024035      C$AAD   037062      C$WTM = 000026      EF12  = 000014 G
AFREG   004561      BVEC    002150      C$AAE   037074      C$WTU = 000027      EF13  = 000015 G
AFSI    024546 G    B$AAB   033604      C$AAK   040072      DAHS  = 000020      EF14  = 000016 G
AFTER   013412      B$AAF   033516      C$AAL   040236      DATEST  014600      EF15  = 000017 G
ALLOC   045460      B.BA    002156      C$ABRT= 000021      DCKMES  003743      EF16  = 000020 G
APT.ER  026450      B.CS    002154      C$ADR = 000020      DECMSG  044004      ELT   = 000002
ARLBA   004516      B.DA    002160      C$AU  = 000054      DEMES   003711      EMSG    024175
ARLCS   004511      B.MP    002162      C$BRK = 000022      DERFLG  002164      EMT.TR  025044 G
ARLDA   004524      CALBCC  002222      C$BSEG= 000004      DERR  = 040000      EM1     004655
ARLMP   004532      CALLPC= 000022      C$BSUB= 000002      DEV.CO  024526 G    EM101   007640
ASSEMB= 000011      CALLPS= 000024      C$BUFF= 000030      DIAGMC= 000000      EM102   007705
A$AAV   031316      CALLSP= 000026      C$CEFG= 000046      DIAG.T  025046 G    EM11    005126
A$AAW   031332      CALLTC= 000030      C$CLEA= 000012      DLT   = 000000      EM13    005167
A$AAX   031344      CAL.CL  052202      C$CLP1= 000006      DLTMES  003750      EM14    005221
A$AAY   031352      CAL.TI  052240 G    C$CVEC= 000036      DMSG    024140      EM15    005247
A$AAZ   031366      CHERR   012602      C$DCLN= 000044      DPDVD   054456 G    EM16    005275
A$ABA   031376      CHKLUP  033620      C$DODU= 000053      DPMUL   054344 G    EM17    005323
BATEST  014476      CHKSTR  046022      C$DRPT= 000024      DRBT  = 000010      EM2     004702
BA16  = 000020      CHKTTY  044110      C$DU  = 000055      DRDY  = 000001      EM3     004727
BA17  = 000040      CHK.MA  031760      C$EDIT= 000002      DRIVE   002152      EM30    005356
BCCFBK  002220      CHK.PC  037110      C$ERDF= 000002      DRMSG   024077      EM30A   005415
BCSR    002144      CHK.SW  026150      C$ERHR= 000003      DROP    011436      EM32    005455
BDDAT   002242      CHRCNT  045342      C$ERSF= 000001      DRPCOD  012506 G    EM33    005511
BEFORE  013360      CH.FLA  031466      C$ERSO= 000004      DRST  = 000010      EM34    005556
BEGPAT  002272      CH.PAS  031504      C$ESCA= 000010      DRTIM   004627      EM37    005633
BEREG   004540      CKERLT  012516      C$ESEG= 000005      DRTYPE  024055      EM4     004754
BGN.SU= 024514      CLEAR.  033102      C$ESUB= 000003      DSPCOD  011444 G    EM41    005673
BINMSG  043770      CLKACC  024754 G    C$ETST= 000001      DS0   = 000000      EM42    005764
BIT0  = 000001 G    CLKBFR  052204      C$EXIT= 000032      DS1   = 000400      EM43    006022
BIT00 = 000001 G    CLKCNT  024752 G    C$GMAN= 000043      DS2   = 001000      EM44    006121
BIT01 = 000002 G    CLKJUM  052610 G    C$GPHR= 000042      DS3   = 001400      EM45    006154
BIT02 = 000004 G    CLKRES  053612 G    C$GPRI= 000040      DUNIT.  024762 G    EM46    006207
BIT03 = 000010 G    CLKSER  053746 G    C$GTIM= 000052      DVC.FT  040042      EM47    006242
BIT04 = 000020 G    CLKSON  025012 G    C$INIT= 000011      DWORD   002254      EM5     005001
BIT05 = 000040 G    CLK.SE  031562      C$INLP= 000020      D$AAG   040746      EM52    006273
BIT06 = 000100 G    CLNCOD  012440 G    C$KWOF= 000035      D$AAH   040764      EM54    006343
BIT07 = 000200 G    CLR.MA  032036      C$KWON= 000034      D$AAI   043532      EM55    006402
BIT08 = 000400 G    CNT   = 000012      C$LOOP= 000100      D$AAJ   043536      EM56    006435
BIT09 = 001000 G    CNTMSG  024030      C$MANI= 000051      D$AAK   043554      EM57    006474
BIT1  = 000002 G    CNVT    050260      C$MSG = 000023      D$AAL   043572      EM6     005052
BIT10 = 002000 G    COMMAN  024564 G    C$PNTB= 000014      D$AAM   043602      EM61    006575
BIT11 = 004000 G    COMMTA  050074      C$PNTF= 000017      EF.CON= 000036 G    EM62    006656
BIT12 = 010000 G    COMP    003762      C$PNTS= 000016      EF.NEW= 000035 G    EM63    006741
BIT13 = 020000 G    CONT    012012      C$PNTX= 000015      EF.PWR= 000034 G    EM64    007022
BIT14 = 040000 G    CONTCL  053672 G    C$POIN= 000040      EF.RES= 000037 G    EM65    007105
BIT15 = 100000 G    CONTIN  011660      C$QIO = 000377      EF.STA= 000040 G    EM66    007166
BIT2  = 000004 G    CRDY  = 000200      C$RDBU= 000007      EF01  = 000001 G    EM67    007251
BIT3  = 000010 G    CRLF    044172      C$REFG= 000050      EF02  = 000002 G    EM7     005100
BIT4  = 000020 G    CRTIM   004602      C$REQT= 000045      EF03  = 000003 G    EM70    007306
BIT5  = 000040 G    CSEND   002744      C$RESE= 000033      EF04  = 000004 G    EM71    007343
BIT6  = 000100 G    CSPAT   002646      C$REVI= 000002      EF05  = 000005 G    EM72    007400
BIT7  = 000200 G    CSR   = 000000      C$RPT = 000025      EF06  = 000006 G    EM73    007433
BIT8  = 000400 G    CSRMSG  024014      C$SEFG= 000047      EF07  = 000007 G    EM74    007466
BIT9  = 001000 G    CSTEST  014356      C$SPRI= 000041      EF08  = 000010 G    EM75    007520
```

```
EM76    007552        FRMT4   011100        G$YES = 000010        LOAD.F  031502        L10001  010124
EM77    007605        FRMT5   011136        HALMAX  002560        LOGMSG  044012        L10002  010166
END     012374        FRMT6   011207        HCORED  031256        LPBFR   024622 G      L10003  010240
ENDPAT  002500        FRMT99  011133        HCOREQ  031166        LPCNTR  024620 G      L10004  010306
END.OF  033070        F$AU  = 000015        HCORET  025002 G      LPT.AD  031144        L10005  010320
END.SU= 055322        F$BGN = 000040        HCRCME  003730        LPT.RE  031140        L10006  010362
ENVIRO  024566 G      F$CLEA= 000007        HC.ADR  024552 G      LSI.RE  031134        L10007  010420
EOP.CH  053770 G      F$DU  = 000016        HC.DEF  024544 G      LUP     052106        L10010  011434
EOP.FM  027334        F$END = 000041        HC.DIA  024542 G      LUP.AD  037112        L10011  011444
EOP.IN  031500        F$HARD= 000004        HDRBUF  003150        L$APT   002036 G      L10012  012436
ERCOUN  002750        F$HW  = 000013        HDRLST  013322        L$AU    012512 G      L10013  012504
ERPOIN  002746        F$INIT= 000006        HERTZ.  031126        L$AUT   002074 G      L10014  012510
ERR   = 100000        F$JMP = 000050        HMAX    002610        L$CCP   002106 G      L10015  012514
ERRFOR  040314        F$MOD = 000000        HNFMES  003736        L$CLEA  012440 G      L10016  013644
ERRHAN  037114        F$MSG = 000011        HOLDSP= 000020        L$CO    002032 G      L10017  014062
ERRVEC  002216        F$PWR = 000017        HPTCOD  011416 G      L$DEPO  002011 G      L10020  014156
ERR.HR  040052        F$RPT = 000012        HRDPRM  023732 G      L$DESC  002102 G      L10021  014252
ERR.NU  024516 G      F$SEG = 000003        HW.ADR  024550 G      L$DEVP  002064 G      L10022  014346
ERR.SF  040056        F$SOFT= 000005        H$AAB   050606        L$DISP  011446 G      L10023  014466
ERR0    010076 G      F$SRV = 000010        ININIT  024772 G      L$DR    002112 G      L10024  014570
ERR1    010114 G      F$SUB = 000002        INITCO  011576 G      L$DRCT  002070 G      L10025  014656
ERR1FO  040400        F$SW  = 000014        INITIA  044020        L$DRS   002072 G      L10026  015002
ERR2    010126 G      F$TEST= 000001        INIT.M  032104        L$DRST  002112 G      L10027  015126
ERR3    010170 G      GARBAG  045344        INIT.R  024606 G      L$DTP   002040 G      L10030  015232
ERR4    010242 G      GDDAT   002240        INPUTA  044746        L$DU    012506 G      L10031  015332
ERR5    010310 G      GETCHR  044050        INTEN = 000100        L$DUT   002076 G      L10032  015422
ERR6    010322 G      GETCMN  047434        INTFLG  002206        L$DVTY  002114 G      L10033  015522
ERR7    010364 G      GETPAR  041126        INTFOR  040244        L$EF    002056 G      L10034  015632
ESC.PC  037106        GETSWI  046430        INTSRV  013640        L$EFLG  002034 G      L10035  015704
EV.COU  024520 G      GET.TW  046200        INVAL.  031052        L$EXP1  002042 G      L10036  015742
E.BA    002170        GLBDAT  002126 G      INVINT  040102        L$EXP2  002044 G      L10037  016066
E.CS    002166        GLBEQA  002126 G      INV.SW  026104        L$EXP3  002046 G      L10040  016226
E.DA    002172        GLBERR  010076 G      IN.SUF  033054        L$HARD  023734 G      L10041  016366
E.MP    002174        GLBSUB  012516 G      I$AU  = 000041        L$HPCP  002016 G      L10042  016572
E.MP1   002176        GLBTXT  003650 G      I$CLN = 000041        L$HPTP  002022 G      L10043  016622
E.MP2   002200        GODRVR= 000202        I$DU  = 000041        L$HW    011420 G      L10044  017026
FILL    044640        GSBIT = 000002        I$HRD = 000041        L$ICP   002104 G      L10045  017112
FILL.C  000204 G      GSTAT = 000004        I$INIT= 000041        L$INIT  011576 G      L10046  017256
FIRST   002244        GSTINT  004452        I$MOD = 000041        L$LADP  002026 G      L10047  017306
FIX     013346        GSTMES  004413        I$MSG = 000041        L$LAST  024514 G      L10050  017460
FLAGS   024560 G      G$EXCP= 000400        I$PWR = 000041        L$MREV  002050 G      L10051  017546
FLAGS1  024562 G      G$HILI= 000002        I$RPT = 000041        L$NAME  002000 G      L10052  017674
FLAGTA  050012        G$LOLI= 000001        I$SEG = 000041        L$REPP  002066 G      L10053  017716
FLAG.I  031546        G$NO  = 000000        I$SFT = 000041        L$REV   002010 G      L10054  017776
FLA.SE  047760        G$OFFS= 000400        I$SRV = 000041        L$SOFT  024110 G      L10055  020142
FLG.MA  031506        G$OFSI= 000376        I$SUB = 000041        L$SPC   002062 G      L10056  020300
FNDFNC  013320        G$PRMA= 000001        I$TST = 000041        L$SPCP  002020 G      L10057  020616
FORM.T  040410        G$PRMD= 000002        J$JMP = 000167        L$SPTP  002024 G      L10060  020654
FREE    045716        G$PRML= 000000        KBPTR   024624 G      L$STA   002030 G      L10061  020720
FRMT1   010752        G$RADA= 000140        KBUF    024626 G      L$SW    011436 G      L10062  021044
FRMT11  011244        G$RADB= 000000        LDCSR   002210        L$TIML  002014 G      L10063  021462
FRMT12  011305        G$RADD= 000040        LDFUNC  013102        L$TIMU  002054 G      L10064  021614
FRMT13  011364        G$RADF= 000200        LF      003760        L$TIM1  002052 G      L10065  021756
FRMT2   011012        G$RADL= 000120        LINE.F  025042 G      L$TSTI  002100 G      L10066  022116
FRMT2A  011031        G$RADO= 000020        LINE1   010422        L$UNIT  002012 G      L10067  022270
FRMT2B  011044        G$RADT= 000100        LINE2   010456        L.CLK.  031112        L10070  022716
FRMT3   011073        G$XFER= 000004        LINE3   010700        L10000  010112        L10071  023436
```

```
L10072  023730          O$GNSW= 000001          SFTPRM  024106 G        TYPEC   044336          T20     016370 G
L10073  024014          O$POIN= 000001          SHIFT   054776 G        TYPEPC  040232          T21     016574 G
L10074  024140          PARSES  047506          SIGN  = 000004          TYPFLA  047654          T22     016624 G
MAJ.IN  024576 G        PAR.LA  043474          SIMBCC  013460          TYPLIN  044234          T23     017030 G
MAJ.LO  052206          PASS.C  024530 G        SIZE  = 000004          TYPNUM  043616          T24     017114 G
MAJ.US  024600 G        PFLG    002202          SKEEND  002644          TYPSTR  044254          T25     017260 G
MAN.TI  001244          PRINTC  045320          SKEND   002602          TYP.ER  040062          T26     017310 G
MAP16   054714 G        PRINTF  050626          SKLST   002502          TY.UNI  033074          T27     017462 G
MASK.B  033616          PRIOR = 000004          SMSG    024164          T$ARGC= 000001          T28     017550 G
MASK.W  033614          PR100 = 000000 G        SPEC.U  031406          T$CODE= 002130          T29     017676 G
MAXCYL  002256          PR101 = 000040 G        SPTCOD  011434 G        T$ERCO= 000062          T3      014160 G
MAXSEC  002252          PR102 = 000100 G        SPV.SE  000400          T$ERRN= 000066          T30     017720 G
MDHEDR  002000 G        PR103 = 000140 G        START   011676          T$EXCP= 000000          T31     020000 G
MEM.SI  031154          PR104 = 000200 G        STARTC  053666 G        T$FLAG= 000040          T32     020144 G
MERLMT  011440          PR105 = 000240 G        START1  011640          T$HILI= 177777          T33     020302 G
MIN.IN  024572 G        PR106 = 000300 G        STHS  = 000100          T$LOLI= 000000          T34     020620 G
MIN.US  024574 G        PR107 = 000340 G        STRCHR  044700          T$LSYM= 010000          T35     020656 G
MK    = 000001          PRNTST  045210          STRT.T  031464          T$NEST= 177777          T36     020722 G
MODR    054256 G        PRO.CM  031460          ST.SET  026316          T$NSK0= 000000          T37     021046 G
MSCRLF  003755          PTAB.S  025000 G        SUNIT.  031470          T$NSK1= 000005          T38     021464 G
MSG.AD  024540 G        PUTCHR  044024          SUPERV  027352          T$SAVL= 177777          T39     021616 G
MSG.TY  024514 G        PWRFLG  002126          SUPFLA  024760 G        T$SEGL= 177777          T4      014254 G
MUL     054212 G        PWR.FA  055150 G        SUPV.T  025132 G        T$SEK0= 010000          T40     021760 G
MXSEC1  002250          PWR.FL  024604 G        SUP.PR  026070          T$SUBN= 000000          T41     022120 G
NEWPRI  053736 G        PWR.MS  055276          SVCGBL= 000000          T$TAGL= 177777          T42     022272 G
NEXTAR  050176          PWR.SA  055272          SVCHAN  034006          T$TAGN= 010075          T43     022720 G
NODRY   003666          PWR.UP  055274          SVCINS= 000000          T$TEMP= 000000          T44     023440 G
NOOP0 = 000000          P.CLK.  031120          SVCSUB= 177777          T$TEST= 000054          T5      014350 G
NOOP7 = 000016          QMAX    002606          SVCTAG= 000000          T$TSTM= 177777          T6      014470 G
NOPINT  004074          QUAMAX  002556          SVCTST= 177777          T$TSTS= 000001          T7      014572 G
NOPMES  004043          RDHDR = 000010          SVHD    002260          T$$AU = 010015          T8      014660 G
NOPWR   011620          READ  = 000014          SWCHAN  031300          T$$CLE= 010013          T9      015004 G
NORES   003650          READ.P  052210 G        SWITCH  050152          T$$DU = 010014          UNITST  002132
NO.CLK  031102          REGBAC  054700 G        SW.ADR  024554 G        T$$HAR= 010073          UNIT.D  024532 G
NO.FLA  047772          REGSAV  054664 G        SW.PTA  031264          T$$HW = 010010          UNI.MA  031410
NO.LPT  045310          REQN.P  024570 G        SYS.FT  040032          T$$INI= 010012          USER.P  024774 G
NO.PTA  031306          REQN.T  031462          S$LSYM= 010000          T$$MSG= 010007          USER.T  024776 G
NR    = 000000          REST    011736          TEMP2   002224          T$$SEG= 010000          UUT     002130
NUMBIN  040434          RESTMS  013064          TEMP3   002226          T$$SOF= 010074          VALID.  025234
NUM.LA  040602          RE.SET  026252          TEMP4   002230          T$$SRV= 010016          VAL.LA  026054
NUM.NO  024556 G        RHDINT  004267          TERMI   052176          T$$SW = 010011          VAL.SW  031520
NUM.UN  025164          RHDMES  004227          TERMLI  050000          T$$TES= 010072          VECMSG  024046
NUNITS  033572          RHHS  = 000100          TERMTA  043762          T.CNTL  002266          VECT  = 000002
NXM   = 020000          RLBA    002136          TEST.M  031420          T.DRIV  002264          WCKINT  004166
NXMMES  003716          RLCS    002134          TIMFLG  024750 G        T.SIZE  011442          WCKMES  004126
NXT     011670          RLDA    002140          TIM.CO  024602 G        T1      013770 G        WHY     002262
NXTFOR  050252          RLMP    002142          TIM.OP  040406          T10     015130 G        WIDTH   041002
OCTMSG  043776          RL2     002604          TMPFNC  002270          T11     015234 G        WRCHK = 000002
OKHDR   013332          RSTACK  054140 G        TMP0    002232          T12     015334 G        WRITE = 000012
OPI   = 002000          SAVEDO= 026450          TMP1    002234          T13     015424 G        WTCRDY  013712
OP.ERR  003770          SEARCH  046146          TMP2    002236          T14     015524 G        WTDRDY  013646
OPIMES  003723          SECMSK  002212          TOO.MA  043742          T15     015634 G        XEQDIA  054024 G
O$APTS= 000000          SEEK  = 000006          TRPFLG  002204          T16     015706 G        XEQSUB  054012 G
O$AU  = 000001          SEGSTA  025014 G        TRPHAN  013632          T17     015744 G        XEQ.CL  033534
O$BGNR= 000000          SEKINT  004361          TST.AB  033730          T18     016070 G        XEQ.CM  031044
O$BGNS= 000001          SEKMES  004330          TST.TO  026132          T19     016230 G        XEQ.IN  033216
O$DU  = 000001          SET.MA  031672          TYPDR = 000006          T2      014064 G        XEQ.LA  027306
```

```
XEQ.OP  033310          XTIME   052676 G        XXX     011720          X$TRUE= 000020          $SAV3   055056 G
XEQ.PR  026510          XTIMEN  053522          X$ALWA= 000000          $BREG   031560          $SAV4   055074 G
XEQ.TE  033354          XTIMST  052720          X$FALS= 000040          $ENDAD  053776 G        $SAV5   055114 G
XPOLY   002214          XXDP.D  031064          X$OFFS= 000400          $SAV2   055042 G

. ABS.  055320    000
        000000    001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  19080 WORDS  ( 75 PAGES)
DYNAMIC MEMORY AVAILABLE FOR  70 PAGES
CZRLGA.BIN,CZRLGA-#SVCRT/M,CZRLGA,DOCTOR
```