

RL11,RLV11

CTLR 1
CZRLGA0

AH-F110A-MC
COPYRIGHT 1979
FICHE 1 OF 1

MAY 1979
digital
MADE IN USA

IDENTIFICATION

SEQ 0001

PRODUCT CODE: AC-F111A-MC
PRODUCT NAME: CZRLGAG RL11/RLV11 CONTROLLER TEST PART 1
DATE CREATED: 5-JAN-79
MAINTAINER: DIAGNOSTIC ENGINEERING
AUTHOR: D. DEKNIS, C. CAMPBELL

THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT CORPORATION. DIGITAL EQUIPMENT CORPORATION ASSUMES NO RESPONSIBILITY FOR ANY ERRORS THAT MAY APPEAR IN THIS MANUAL.

THE SOFTWARE DESCRIBED IN THIS DOCUMENT IS FURNISHED TO THE PURCHASER UNDER A LICENSE FOR USE ON A SINGLE COMPUTER SYSTEM AND CAN BE COPIED (WITH INCLUSION OF DIGITAL'S COPYRIGHT NOTICE) ONLY FOR USE IN SUCH SYSTEM, EXCEPT AS MAY OTHERWISE BE PROVIDED IN WRITING BY DIGITAL.

DIGITAL EQUIPMENT CORPORATION ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS SOFTWARE ON EQUIPMENT THAT IS NOT SUPPLIED BY DIGITAL.

COPYRIGHT (C) 1979, DIGITAL EQUIPMENT CORPORATION

TABLE OF CONTENTS

1.0	GENERAL INFORMATION
1.1	PROGRAM ABSTRACT
1.2	SYSTEM REQUIREMENTS
1.3	RELATED DOCUMENTS AND STANDARDS
1.4	DIAGNOSTIC HIERARCHY PREREQUISITES
1.5	ASSUMPTIONS
2.0	OPERATING INSTRUCTIONS
2.1	HOW TO RUN THIS DIAGNOSTIC
2.1.1	THE SIX STEPS OF EXECUTION
2.1.2	SAMPLE RUN-THROUGH
2.2	HOW TO CREATE A CHAINABLE FILE
2.3	DETAILS OF COMMANDS AND SYNTAX
2.3.1	TABLE OF COMMAND VALIDITY
2.3.2	COMMAND SYNTAX
2.4	EXTENDED P-TABLE DIALOGUE
2.5	HARDWARE PARAMETERS
2.6	SOFTWARE PARAMETERS
3.0	ERROR INFORMATION
4.0	PERFORMANCE AND PROGRESS REPORTS
5.0	DEVICE INFORMATION TABLES
6.0	TEST SUMMARIES

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 RLO1 DRIVES WITH RLO1K 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

CZRLGAO 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 HIERARCHY PREREQUISITES

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

CVRLAAO 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:

<u>QUESTION</u>	<u>MEANING</u>
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 ERROR IS ENCOUNTERED, THEN ONE OF THREE THINGS HAPPENS, DEPENDING ON THE SETTINGS OF THE HOE AND LOE FLAGS.

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

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

NEITHER HOE NOR LOE SET: THE ERROR WILL BE REPORTED ON THE CONSOLE AND NORMAL EXECUTION WILL RESUME AS IF NO ERROR HAD 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 DIFFERENT FLAG SETTINGS. PROBABLY YOU WOULD WANT TO SAY:

PRO/FLAGS:IER:LOE:HOE=0

THIS WILL DO THE FOLLOWING:

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

THE DIAGNOSTIC WILL NOW LOOP ON THE BLOCK OF CODE THAT DETECTED AND REPORTED THE ERROR, BUT NO ERROR PRINTOUT WILL OCCUR. THUS YOU CAN STUDY THE ERROR OR SCOPE IT OR WHATEVER.

WHEN YOU'VE SEEN ENOUGH, YOU MAY HIT CONTROL/C. THIS WILL TAKE YOU OUT OF THE LOOP AND PUT YOU BACK INTO COMMAND MODE. YOU NOW HAVE THREE CHOICES:

1. START
2. RESTART
3. CONTINUE

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

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

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

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

1. START
2. RESTART

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

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

	BY WHOM ENTERED: -----
.R 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:MOE: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

*MICORE 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 MOE 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 () 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, SUB-TEST, 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 MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS.

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

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

THE QUESTION "CHANGE SW?" IS ASKED AND THE ANSWERS GIVEN BECOME THE NEW DEFAULTS. THE COMMAND MAY BE ISSUED WHEN COMMAND 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.

(ON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>

COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C. THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE. SOFTWARE DIALOGUE MAY OPTIONALLY BE RE-EXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

THE SWITCH ARGUMENTS ARE AS IN THE START COMMAND EXCEPT:

1. DEFAULT FOR PASS-CNT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART
2. UNSPECIFIED FLAG SETTINGS ARE UNCHANGED

PRO(CCEED)/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 CARRY 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 RLOX DRIVE SYSTEM. THIS SYSTEM HAS TWO (2) RL11 TYPE CONTROLLERS ALL TO BE SET AT "BR LEVEL" 5. THE FIRST 4 DRIVES ARE RLO1'S AND THE LAST 4 DRIVES ARE RLO2'S (ON THE SECOND CONTROLLER):

UNITS (D) ? 8

UNIT 1

RL11 (L) Y ?

BUS ADDRESS (O) 174400 ?

VECTOR (O) 160 ?

DRIVE (O) 0 ? 0-3

DRIVE TYPE = RLO1 (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 = RLO1 (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 RLO1'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 RLO2 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 RLO2 CONTROLLER (175400). THE SECOND CONTROLLER'S VECTOR WAS ALSO CHANGED TO 164 IN QUESTION #3. THE RLO2 TEST UNIT NUMBERS WERE ASSIGNED VALUES 0 TO 3 IN QUESTION #4 AND THE DRIVE TYPE WAS SET FOR RLO2'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 RESPONSE.

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 RELEVANT DATA.

3.1 ERROR REPORTING -----

ALL ERROR INFORMATION IS PRINTED ON THE CONSOLE DECIVE. ERROR RE-
PORTS 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 RELEVANT 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 (CON-
TROLLER 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 (CONTROLLER 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 THAT 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 WITH 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 DISTURB
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 GEN-
ERATE 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 TEST 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.

1-	75	GLOBAL DATA
1-	129	PATTERNS FOR REGISTER R/W
1-	203	PATTERNS FOR DIFFERENCE WORD
1-	297	GLOBAL TEXT
1-	390	GLOBAL ERRORS
2-	128	INITIALIZATION CODE
2-	292	GLOBAL SUBROUTINES
2-	313	ROUTINE TO CHECK FOR CONTROLLER ERRORS
2-	393	LOAD RLCS
2-	487	ROUTINE TO CALCULATE CRC
2-	588	**TEST 1** - RLCS ADDRESSABILITY
2-	613	**TEST 2** - RLBA ADDRESSABILITY
2-	639	**TEST 3** - RLDA ADDRESSABILITY
2-	664	**TEST 4** - RLMP ADDRESSABILITY
2-	689	**TEST 5** - READ WRITE OF RLCS
2-	731	**TEST 6** - READ WRITE OF RLBA
3-	11	**TEST 7** - READ WRITE OF RLDA
3-	44	**TEST 8** - BIS OF RLCS
3-	82	**TEST 9** - BIC OF RLCS
3-	118	**TEST 10** - BIS OF RLBA
3-	153	**TEST 11** - BIC OF RLBA
3-	185	**TEST 12** - BIS OF RLDA
3-	216	**TEST 13** - BIC OF RLDA
3-	248	**TEST 14** - BUS RESET OF RLCS
3-	284	**TEST 15** - BUS RESET OF RLBA
3-	310	**TEST 16** - BUS RESET OF RLDA
3-	333	**TEST 17** - UNIQUENESS OF RLCS
3-	375	**TEST 18** - UNIQUENESS OF RLBA
3-	417	**TEST 19** - UNIQUENESS OF RLDA
3-	461	**TEST 20** - UNIQUENESS OF RLMP
3-	514	**TEST 21** - NOOP FUNCTION(RL11 ONLY)
3-	543	**TEST 22** - TEST NOOP DOES NOTHING
3-	597	**TEST 23** - TEST OF INTERRUPT
3-	634	**TEST 24** - TEST PRIORITY BR LEVEL
3-	685	**TEST 25** - GET STATUS FUNCTION
3-	710	**TEST 26** - GET STATUS FUNCTION INTERRUPT
3-	743	**TEST 27** - GET STATUS FUNCTION GENERATES OPI W/O GS BIT
3-	773	**TEST 28** - OPI UNDER INTERRUPT
3-	811	**TEST 29** - READ HEADER FUNCTION
5-	1	**TEST 30** - READ HEADER FUNCTION INTERRUPT
6-	7	**TEST 31** - REPEATED RD HDRS YIELD SAME CYL AND HD
6-	55	**TEST 32** - CHECK OF HEADER CRC
6-	97	**TEST 33** - CHECK CONSECUTIVE HEADERS
6-	171	**TEST 34** - SEEK FUNCTION
6-	194	**TEST 35** - CHECK DRIVE READY ON SEEK
6-	224	**TEST 36** - SEEK FUNCTION INTERRUPT
6-	270	**TEST 37** - TEST DIFFERENCE WORD TRANSMISSION
6-	393	**TEST 38** - VERIFY HEAD SELECT 0 VIA RD HDR
6-	441	**TEST 39** - VERIFY HEAD SELECT 1 VIA RD HDR
6-	488	**TEST 40** - VERIFY HEAD SELECT 0 VIA GET STATUS
6-	535	**TEST 41** - VERIFY HEAD SELECT 1 VIA GET STATUS
6-	583	**TEST 42** - TEST TIME AT WHICH DIF WD GETS TRANSMITTED
6-	682	**TEST 43** - EXTENSIVE CHECK OF HEADER CRC
6-	817	**TEST 44** - VERIFY GET STATUS WHILE DRDY IS LOW
7-	1	DIAGNOSTIC SUPERVISOR -- LOW CORE SET UP

1		.TITLE CZRLGAO RL11/RLV11 CTLR 1
2		.ENABLE AMA
3	000000	.ENABLE ABS
4		.NLIST ME,CND,MD
5		.MCALL SVC
6		
7	000000	SVC
8	000000	SVCINS=0
9	000000	SVCTAG=0
10	002000	.=2000
11		
12	002000	POINTER BGNSFT,BGNSW,BGNDU,BGNAU
13		
14	002000	BGNMOD MDHEDR
15		
16	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 /O/
	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

```

17 002106 012440          .WORD  L$CLEAN
18 002110                ENDMOD
19
20 002110                DEVREG
   002110 000000          .WORD  0
                              .BLKW
21
22 002114                DEVTYP <RL01,RL02>
   002114          122      114      060      .ASCIZ  /RL01,RL02/
   002117          061      054      122
   002122          114      060      062
   002125          000
23 002126                .EVEN
   BGNMOD  GLBEQAT
24
25 002126                EQUALS
26          000001        DRDY=BIT0          ;DRIVE READY (RLCS)
27          000100        INTEN=BIT6         ;INTERRUPT ENABLE (RLCS)
28          100000        ERR=BIT15         ;RL11 ERROR (RLCS)
29          040000        DERR=BIT14        ;RL01 DRIVE ERROR (RLCS)
30          002000        GPI=BIT10         ;OPERATION INCOMPLETE (RLCS)
31          000200        CRDY=BIT7         ;CONTROLLER READY (RLCS)
32          000040        BA17=BIT5         ;EXTENDED ADDRESS BIT 17 (RLCS)
33          000020        BA16=BIT4         ;EXTENDED ADDRESS BIT 16 (RLCS)
34          020000        NXM=BIT13        ;NON-EXISTANT MEMORY (RLCS)
35          000000        DS0=0             ;DRIVE SELECT 0 (RLCS)
36          000400        DS1=BIT8         ;DRIVE SELECT 1 (RLCS)
37          001000        DS2=BIT9         ;DRIVE SELECT 2 (RLCS)
38          001400        DS3=BIT8!BIT9    ;DRIVE SELECT 3 (RLCS)
39          000000        NOOP0=0          ;FUNCTION-NOOP(0)
40          000016        NOOP7=BIT11!BIT2!BIT3 ;FUNCTION-NOOP(7)
41          000002        WRCHK=BIT1        ;WRITE CHECK FUNCTION
42          000004        GSTAT=BIT2        ;GET STATUS FUNCTION
43          000006        SEEK=BIT2!BIT1    ;SEEK FUNCTION
44          000010        RDHDR=BIT3        ;READ HEADER FUNCTION
45          000012        WRITE=BIT3!BIT1   ;WRITE DATA FUNCTION
46          000014        READ=BIT3!BIT2    ;READ DATA FUNCTION
47          000202        GODRVR=BIT11!BIT7 ;CRDY AND DRDY
48          000010        DRST=BIT3        ;DRIVE RESET (RLDA)
49          000002        GSBIT=BIT1        ;GET STATUS BIT (RLDA)
50          000001        MK=BIT0          ;MARKER BIT (RLDA)
51          000004        SIGN=BIT2        ;SIGN BIT (RLDA)
52          000100        RHMS=BIT6        ;HEAD SELECT IN READ HEADER
53          000100        STHS=BIT6        ;HEAD SELECT IN STATUS BACK
54          000020        DAHS=BIT4        ;HEAD SELECT IN SEEK
55
56          ;OFFSET FOR HARDWARE P-TABLE
57
58          000000        CSR=0
59          000002        VECT=2
60          000004        PRIOR=4
61          000006        TYPDR=6
62          000010        DRBT=10
63          000012        CNT=12
64
65          ;OFFSET FOR SOFTWARE P-TABLE

```

```

66
67          000000          DLT=0
68          000002          ELT=2
69          000004          SIZE=4
70
71 002126          ENDMOD
72
73 002126          BGNMOD  GLBDAT
74
75          .SBTTL  GLOBAL DATA
76
77 002126  000000          PWRFLG: .WORD  0
78 002130  000000          UUT:      .WORD  0
79 002132  000000          UNITST: .WORD  0
80 002134  000000          RLCS:   .WORD  0
81 002136  000000          RLBA:   .WORD  0
82 002140  000000          RLDA:   .WORD  0
83 002142  000000          RLMP:   .WORD  0
84 002144  000000          BCSR:   .WORD  0
85 002146  000000          BPRIOR: .WORD  0
86 002150  000000          BVEC:   .WORD  0
87 002152  000000          DRIVE: .WORD  0          ;DRIVE UNDER TEST
88 002154  000000          B.CS:   .WORD  0
89 002156  000000          B.BA:   .WORD  0
90 002160  000000          B.DA:   .WORD  0
91 002162  000000          B.MP:   .WORD  0
92 002164  000000          DERFLG: .WORD
93 002166  000000          E.CS:   .WORD  0
94 002170  000000          E.BA:   .WORD  0
95 002172  000000          E.DA:   .WORD  0
96 002174  000000          E.MP:   .WORD  0
97 002176  000000          E.MP1: .WORD  0
98 002200  000000          E.MP2: .WORD  0
99 002202  000000          PFLG:   .WORD  0          ;PROCESSOR TYPE  0=UNIBUS  1-Q-BUS
100 002204  000000          TRPFLG: .WORD  0
101 002206  000000          INTFLG: .WORD  0          ;INTERRUPT OCCURANCE FLAG
102 002210  000000          LDCSR:  .WORD  0          ;LOCATION TO FORM RLCS
103 002212  000077          SECMSK: .WORD  77          ;MASK OUT SECTOR
104 002214  120001          XPOLY:  .WORD  120001
105 002216  000004          ERRVEC: .WORD  4
106 002220  000000          BCCFBK: .WORD  0          ;LOCATION USED BY "SIMBCC"
107 002222  000000          CALBCC: .WORD  0          ;LOCATION USED BY "SIMBCC"
108 002224  000000          TEMP2:  .WORD  0          ;LOCATION USED BY "SIMBCC"
109 002226  000000          TEMP3:  .WORD  0          ;LOCATION USED BY "SIMBCC"
110 002230  000000          TEMP4:  .WORD  0          ;LOCATION USED BY "SIMBCC"
111 002232  000000          TMP0:   .WORD  0
112 002234  000000          TMP1:   .WORD  0
113 002236  000000          TMP2:   .WORD  0
114 002240  000000          GDDAT:  .WORD  0
115 002242  000000          BDDAT:  .WORD  0
116 002244  000000          FIRST:  .WORD  0          ;FIRST SECTOR READ
117 002246  177700          CYLMSK: .WORD  177700      ;MASK CYLINDER AND HEAD SELECT
118 002250  000050          MXSEC1: .WORD  40.        ;MAX SECTOR ADDRESS +1
119 002252  000047          MAXSEC:  .WORD  39.        ;MAX SECTOR ADDRESS
120 002254  000000          DWORD:  .WORD  0          ;DIFFERENCE WORD (SEEK)
121 002256  177600          MAXCYL: .WORD  177600      ;MAXIMUM CYLINDER ADDRESS
122 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.CNTRLR:    .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
```

180	002426	020000	20000	
181	002430	040000	40000	
182	002432	100000	100000	
183	002434	177777	177777	;WALKING 0
184	002436	177776	177776	
185	002440	177775	177775	
186	002442	177773	177773	
187	002444	177767	177767	
188	002446	177757	177757	
189	002450	177737	177737	
190	002452	177677	177677	
191	002454	177577	177577	
192	002456	177377	177377	
193	002460	176777	176777	
194	002462	175777	175777	
195	002464	173777	173777	
196	002466	167777	167777	
197	002470	157777	157777	
198	002472	137777	137777	
199	002474	077777	077777	
200	002476	177777	177777	
201	002500	000000		ENDPAT: 000000

202
203 .SBTTL PATTERNS FOR DIFFERENCE WORD

205	002502	000200	SKLST: .WORD BIT7	
206	002504	000400	.WORD BIT8	;SHIFTING 1
207	002506	001000	.WORD BIT9	
208	002510	002000	.WORD BIT10	
209	002512	004000	.WORD BIT11	
210	002514	010000	.WORD BIT12	
211	002516	020000	.WORD BIT13	
212	002520	040000	.WORD BIT14	
213	002522	077600	.WORD 77600	;SHIFTING 0
214	002524	077400	.WORD 77400	
215	002526	076600	.WORD 76600	
216	002530	075600	.WORD 75600	
217	002532	073600	.WORD 73600	
218	002534	067600	.WORD 67600	
219	002536	057600	.WORD 57600	
220	002540	037600	.WORD 37600	
221	002542	077600	.WORD 77600	
222	002544	000200	.WORD 200	
223	002546	000600	.WORD 600	;GROWING 1
224	002550	001600	.WORD 1600	
225	002552	003600	.WORD 3600	
226	002554	007600	.WORD 7600	
227	002556	017600	QUAMAX: .WORD 17600	
228	002560	037600	HALMAX: .WORD 37600	
229	002562	077600	.WORD 77600	
230	002564	077400	.WORD 77400	;GROWING 0
231	002566	077000	.WORD 77000	
232	002570	076000	.WORD 76000	
233	002572	074000	.WORD 74000	
234	002574	070000	.WORD 70000	
235	002576	060000	.WORD 60000	
236	002600	040000	.WORD 40000	

237 002602 000000
238 002604 100000
239 002606 037600
240 002610 077600
241
242 002612 177600
243 002614 177400
244 002616 176600
245 002620 173600
246 002622 167600
247 002624 157600
248 002626 137600
249 002630 177000
250 002632 176000
251 002634 174000
252 002636 170000
253 002640 060000
254 002642 040000
255 002644 000000
256
257
258
259 002646 000000
260 002650 000002
261 002652 000004
262 002654 000010
263 002656 000020
264 002660 000040
265 002662 000100
266 002664 000400
267 002666 001000
268 002670 001576
269 002672 001574
270 002674 001570
271 002676 001560
272 002700 001540
273 002702 001500
274 002704 001400
275 002706 001576
276 002710 001574
277 002712 001566
278 002714 001556
279 002716 001536
280 002720 001436
281 002722 001136
282 002724 000076
283 002726 000006
284 002730 000016
285 002732 000036
286 002734 000076
287 002736 000176
288 002740 000576
289 002742 001576
290 002744 000000
291 002746 000000
292 002750
293 003150

SKEND: .WORD 00000
RL2: .WORD BIT15
QMAX: .WORD 37600
HMAX: .WORD 77600

.WORD 177600
.WORD 177400
.WORD 176600
.WORD 173600
.WORD 167600
.WORD 157600
.WORD 137600
.WORD 177000
.WORD 176000
.WORD 174000
.WORD 170000
.WORD 60000
.WORD 40000
SKEEND: .WORD 000000

:PATTERNS FOR TEST OF RLCS

CSPAT: .WORD 0 ;SHIFTING 1
.WORD BIT1
.WORD BIT2
.WORD BIT3
.WORD BIT4
.WORD BIT5
.WORD BIT6
.WORD BIT8
.WORD BIT9
.WORD 1576 ;GROWING 0
.WORD 1574
.WORD 1570
.WORD 1560
.WORD 1540
.WORD 1500
.WORD 1400
.WORD 1576 ;SHIFT 0
.WORD 1574
.WORD 1566
.WORD 1556
.WORD 1536
.WORD 1436
.WORD 1136
.WORD 76
.WORD 6 ;GROWING 1
.WORD 16
.WORD 36
.WORD 76
.WORD 176
.WORD 576
.WORD 1576
CSEND: .WORD 0
ERPCINT: .WORD 0
ERCOUNT: .BLKW 64.
HDRBUF: .BLKW 160.

		ENDMOD			
		BGNMOD	GLBTXT		
		.SBTTL	GLOBAL	TEXT	
294	003650				
295					
296	003650				
297					
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	HRCMES: .ASCIZ / HRC/
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	NOPIINT: .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/

```
354 006022      123      105      103  EM43:  .ASCIZ  /SECTOR ADDRESS OUT OF SEQUENCE DURING CONSECUTIVE READ HEADERS/
355 006121      127      122      111  EM44:  .ASCIZ  /WRITING RLMP MODIFIED RLCS/
356 006154      127      122      111  EM45:  .ASCIZ  /WRITING RLMP MODIFIED RLBA/
357 006207      127      122      111  EM46:  .ASCIZ  /WRITING RLMP MODIFIED RLDA/
358 006242      123      105      105  EM47:  .ASCIZ  /SEEK WOULD NOT INTERRUPT/
359 006273      104      122      111  EM52:  .ASCIZ  /DRIVE READY CAUSED EXTRANEIOUS INTERRUPT/
360 006343      102      101      104  EM54:  .ASCIZ  /BAD SEEK-TEST OF DIFFENCE WORD/
361 006402      102      101      104  EM55:  .ASCIZ  /BAD HEAD SELECT VIA RD HDR/
362 006435      102      101      104  EM56:  .ASCIZ  /BAD HEAD SELECT VIA GET STATUS/
363 006474      114      117      101  EM57:  .ASCIZ  /LOADING RLDA BEFORE DRIVE READY ON SEEK/<15><12>
364 006545      104      122      111  .ASCIZ  /DRIVE READY DID NOT SET/
365 006575      102      111      124  EM61:  .ASCIZ  /BIT SET INSTRUCTION ON RLCS YIELDED WRONG RESULT/
366 006656      102      111      124  EM62:  .ASCIZ  /BIT CLEAR INSTRUCTION ON RLCS YIELDED WRONG RESULT/
367 006741      102      111      124  EM63:  .ASCIZ  /BIT SET INSTRUCTION ON RLBA YIELDED WRONG RESULT/
368 007022      102      111      124  EM64:  .ASCIZ  /BIT CLEAR INSTRUCTION ON RLBA YIELDED WRONG RESULT/
369 007105      102      111      124  EM65:  .ASCIZ  /BIT SET INSTRUCTION ON RLDA YIELDED WRONG RESULT/
370 007166      102      111      124  EM66:  .ASCIZ  /BIT CLEAR INSTRUCTION ON RLDA YIELDED WRONG RESULT/
371 007251      102      125      123  EM67:  .ASCIZ  /BUS RESET DID NOT CLEAR RLCS/
372 007306      102      125      123  EM70:  .ASCIZ  /BUS RESET DID NOT CLEAR RLBA/
373 007343      102      125      123  EM71:  .ASCIZ  /BUS RESET DID NOT CLEAR RLDA/
374 007400      127      122      111  EM72:  .ASCIZ  /WRITING RLCS MODIFIED RLBA/
375 007433      127      122      111  EM73:  .ASCIZ  /WRITING RLCS MODIFIED RLDA/
376 007466      127      122      111  EM74:  .ASCIZ  /WRITING RLBA MODIFIED RLCS/
377 007520      127      122      111  EM75:  .ASCIZ  /WRITING RLBA MODIFIED RLDA/
378 007552      127      122      111  EM76:  .ASCIZ  /WRITING RLDA MODIFIED RLCS/
379 007605      127      122      111  EM77:  .ASCIZ  /WRITING RLDA MODIFIED RLBA/
380 007640      122      114      103  EM101: .ASCIZ  /RLCS CONTAINED FOLLOWING ERROR(S): /
381 007705      .BLKB  120.
382
383
384          .EVEN
388 010076          ENDMOD
389
390          .SBTTL  GLOBAL ERRORS
391
392 010076          BGNMOD  GLBERR
393
394 010076          BGNMSG  ERRO
395
396 010076  004737  010422          JSR    PC,LINE1
397 010102  004737  010456          JSR    PC,LINE2
398
399 010106  004537  012516          JSR    R5,CKERLT          ;CHECK ERROR LIMIT
400 010112          ENDMMSG
      010112          L10000:
      010112  104023          EMT    C$MSG
401
402 010114          BGNMSG  ERR1
403
404 010114  004737  010422          JSR    PC,LINE1
405
406 010120  004537  012516          JSR    R5,CKERLT          ;CHECK ERROR LIMIT
407 010124          ENDMMSG
      010124          L10001:
      010124  104023          EMT    C$MSG
```

1					
2	010126		BGNMSG	ERR2	
3					
4	010126	004737	010422		
5	010132			JSR	PC,LINE1
	010132	013746	002242	PRINTB	#FRMT4,GDDAT,BDDAT
	010136	013746	002240	MOV	BDDAT,-(SP)
	010142	012746	011100	MOV	GDDAT,-(SP)
	010146	012746	000003	MOV	#FRMT4,-(SP)
	010152	010600		MOV	#3,-(SP)
	010154	104014		MOV	SP,RO
	010156	062706	000010	EMT	C\$PNTB
				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,TMPO,BDDAT,GDDAT
	010200	013746	002240	MOV	GDDAT,-(SP)
	010204	013746	002242	MOV	BDDAT,-(SP)
	010210	013746	002232	MOV	TMPO,-(SP)
	010214	012746	011136	MOV	#FRMT5,-(SP)
	010220	012746	000004	MOV	#4,-(SP)
	010224	010600		MOV	SP,RO
	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,RO
	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					

30	010310	004737	010422		JSR	PC,LINE1	
31							
32	010314	004537	012516		JSR	R5,CKERLT	;CHECK ERROR LIMIT
33	010320				ENDMSG		
	010320	104023		L10005:	EMT	C\$MSG	
34							
35	010322			BGNMSG	ERR6		
36							
37	010322	004737	010422		JSR	PC,LINE1	
38	010326	004737	010700		JSR	PC,LINE3	
39	010332	004737	010456		JSR	PC,LINE2	
40							
41							
42	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	
43	010356	004537	012516		JSR	R5,CKERLT	;CHECK ERROR LIMIT
44	010362				ENDMSG		
	010362	104023		L10006:	EMT	C\$MSG	
45							
46	010364			BGNMSG	ERR7		
47							
48	010364	004737	010422		JSR	PC,LINE1	
49	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	
50							
51	010414	004537	012516		JSR	R5,CKERLT	
52							
53	010420				ENDMSG		
	010420	104023		L10007:	EMT	C\$MSG	
54							
55	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	
56	010454	000207			RTS	PC	
57							
58	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,F.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

```
67
71
72 010752      045      101      103  FRMT1:  .ASCIZ  /%ACONTROLLFR: %06%A  DRIVE: %01/
73 011012      045      116      045  FRMT2:  .ASCIZ  /%N%T%T%06%T%06/
74 011031      045      124      045  FRMT2A: .ASCIZ  /%T%06%T%06/
75 011044      045      124      045  FRMT2B: .ASCIZ  /%T%06%T%06%A %06%A %06/
76 011073      045      116      045  FRMT3:  .ASCIZ  /%N%T/
77 011100      045      116      045  FRMT4:  .ASCIZ  /%N%AE%P'D: %06%A REC'D: %06/
78 011133      045      116      000  FRMT99: .ASCIZ  /%N/
79 011136      045      116      045  FRMT5:  .ASCIZ  /%N%ALAST: %06%A PRES: %06%A EXP'D: %06%N/
80 011207      045      116      045  FRMT6:  .ASCIZ  /%N%AA%T PROCESSOR LEVEL %06%N/
81 011244      045      101      105  FRMT11: .ASCIZ  /%AERROR LIMIT EXCEEDED-DROPPED%N/
82 011305      045      116      045  FRMT12: .ASCIZ  /%N%ADRIVE DID NOT RECOVER FROM POWER FAILURE%N/
83 011364      045      116      045  FRMT13: .ASCIZ  /%N%T%A - WILL NOT TEST%N/
84
85              .EVEN
86
87
91
92
93
94 011416                      ENDMOD
95
96 011416          BGNMOD  HPTCODE
97
98 011416          BGNHW
99 011416 000006          .WORD  L10010-L%HW/2
100 011420 174400          .WORD  174400          ;CSR
101 011422 000160          .WORD  160          ;VECTOR
102 011424 000240          .WORD  240          ;PRIORITY
103 011426 000001          .WORD  1          ;RL01 = 1
104 011430 000000          .WORD  0          ;DRIVE (BITS 8,9,10)
105 011432 000001          .WORD  1          ;RL11 - 1, RLV11 - 0
106 011434          ENDSW
107 011434          L10010:
108 011434                      ENDMOD
109
110 011434          BGNMOD  SPTCODE
111
112 011434          BGNSW
113 011434 000003          .WORD  L10011-L%SW/2
114 011436 000000          DROP:  .WORD  0
115 011440 000012          MERLMT: .WORD  10.
116 011442 000000          T.SIZE: .WORD  0
117
118 011444          ENDSW
119 011444          L10011:
120 011444                      ENDMOD
121
122 011444          BGNMOD  DSPCODE
123
124 011444          DISPATCH  44
125 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	EMT	CSRESET	
134	011600	READEF	#EF.PWR	:POWER UP?????
	011600	MOV	#EF.PWR,R0	
	011604	EMT	CSREFG	

```

135 011606          BNCOMPLETE      NOPWR          ;NO,BRANCH
      011606 103004          BCC          NOPWR
136 011610 013737 002012 002126      MOV          LSUNIT,PWRFIG      ;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,RO
      011624 104050          EMT          CSREFG
139 011626          BCOMPLETE START1
      011626 103404          BCS          START1
140 011630          READEF #EF.START          ;START???
      011630 012700 000040      MOV          #EF.START,RO
      011634 104050          EMT          CSREFG
141 011636          BNCOMPLETE      CONTINUE
      011636 103010          BCC          CONTINUE
142 011640 012700 002750          START1: MOV          #ERCOUNT,RO
143 011644 012701 000100          MOV          #64.,R1
144 011650 005020          1$: CLR          (RO)+
145 011652 005301          DEC          R1
146 011654 001375          BNE          1$
147 011656 000407          BR          START
148
149 011660          CONTINUE: READEF #EF.CONTINUE ;CONTINUE????
      011660 012700 000036      MOV          #EF.CONTINUE,RO
      011664 104050          EMT          CSREFG
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          LSUNIT,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,RO
      011736 013700 002132      MOV          UNITST,RO
      011742 104042          EMT          CS$GPHRD
162 011744          BCCOMPLETE      1$
      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          (RO)+,BCSP
168 011766 012037 002150          MOV          (RO)+,BVEC
169 011772 012037 002146          MOV          (RO)+,BPRIOR
170 011776 012037 002264          MOV          (RO)+,T.DRIVE
171 012002 012037 002152          MOV          (RO)+,DRIVE
172 012006 012037 002266          MOV          (RO)+,T.CNTRLR ;GET CONTROLLER TYPE
173
174 012012 013700 002144          CONT: MOV          BCSR,RO
175 012016 010037 002134          MOV          RO,RLCS
176 012022 062700 000002          ADD          #2,RO
177 012026 010037 002136          MOV          RO,RLBA
178 012032 062700 000002          ADD          #2,RO

```

```

179 012036 010037 002140      MOV      R0,RLDA
180 012042 062700 000002      ADD      #2,R0
181 012046 010037 002142      MOV      R0,RLMP
182 012052 005737 002126      TST      PWRFLG
183 012056 001064              BNE      5$
184 012060 005737 011442      TST      T.SIZE                ;DO WE WANT TO CHECK UNITS??
185 012064 001461              BEQ      5$                ;NO
186
187 012066 005037 002204      CLR      TRPFLG                ;CLR OUT TRAP FLAG
188 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$SVEC
      012114 062706 000010      ADD      #10,SP
189 012120 005777 170010      TST      @RLCS                ;ACCESS CONTROLLER
190 012124              CLRVEC  ERRVEC                ;RELEASE VECTOR
      012124 013700 002216      MOV      ERRVEC,R0
      012130 104036              EMT      C$CVEC
191 012132 005737 002204      TST      TRPFLG                ;DID IT TRAP
192 012136 001404              BEQ      7$                ;NO, CHECK IT'S DRIVE
193 012140 012737 003650 002262      MOV      #NORES,WHY           ;SETUP ERR MESS
194 012146 000415              BR       8$
195
196 012150 012777 000200 167756 7$:  MOV      #200,@RLCS           ;CONTROLLER READY
197 012156 053777 002152 167750      BIS      DRIVE,@RLCS         ;SELECT DRIVE
198 012164 032777 000001 167742      BIT      #1,@RLCS           ;DRIVE THERE
199 012172 001016              BNE      5$                ;YES
200 012174 012737 003666 002262      MOV      #NODRY,WHY          ;SETUP ERR MESS
201 012202              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$PNTB
      012222 062706 000006      ADD      #6,SP
202 012226 000434              BR       6$
203
204 012230 005737 002126 5$:  TST      PWRFLG                ;RECENT POWER FAILURE????
205 012234 001457              BEQ      END                ;NO
206
207              ;THERE WAS A RECENT POWER FAILURE, THEREFORE WE WILL WAIT
208              ;SIXTY SECONDS FOR THE DRIVE TO COME READY
209
210 012236 012701 000074              MOV      #60.,R1                ;SIXTY SECOND TIMEOUT
211 012242 012777 000200 167664      MOV      #200,@RLCS         ;SET CRDY
212 012250 053777 002152 167656      BIS      DRIVE,@RLCS         ;SET IN DRIVE SELECT
213 012256 032777 000001 167650 2$:  BIT      #DRDY,@RLCS         ;DRIVE READY???
214 012264 001023              BNE      3$                ;YES, THEN START TEST
215
216 012266              WAITMS #10.                ;WAIT A SECOND
      012266 012700 000012      MOV      #10.,R0
      012272 104026              EMT      C$WTM
217
218 012274 005301              DEC      R1                ;SIXTY SECONDS GONE BY
219 012276 001367              BNE      2$                ;NO, GO BACK

```

```

220
221 012300          PRINTB  #FRMT12          ;DROPPING DRIVE
    012300 012746 011305      MOV      #FRMT12,-(SP)
    012304 012746 00000i     MOV      #1,-(SP)
    012310 010600          MOV      SP,R0
    012312 104014          EMT      C$PNTB
    012314 062706 000004     ADD      #4,SP
222 012320 004737 010422     6$: JSR      PC,LINE1          ;GIVE DRIVE INFO
223 012324          DODU      UNITST          ;TELL SUPERVISOR TO DROP IT
    012324 013700 002132     MOV      UNITST,R0
    012330 104053          EMT      C$DODU
224 012332          DOCLN          ;FORCE AN ABORT
    012332 104044          EMT      C$DCLN
225
226
227 012334 012777 000013 167576 3$: MOV      #13,@RLDA          ;SETUP DR RST
228 012342 012777 000204 167564     MOV      #204,@RLCS          ;GS FUNC
229 012350 053777 002152 167556     BIS      DRIVE,@RLCS          ;SELECT DRIVE
230 012356 042777 000200 167550     BIC      #200,@RLCS          ;ISSUE IT
231 012364 032777 000200 167542 4$: BIT      #200,@RLCS          ;WAIT FOR READY
232 012372 001774          BEQ      4$
233
234 G12374          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$SVEC
    012416 062706 000010     ADD      #10,SP
235 012422 005037 002202     CLR      PFLG          ;CLR PROCESSOR FLAG
236 012426          READBUS          ;Q-BUS
    012426 104007          EMT      C$RDBU
237 012430          BNCOMPLETE 1$
    012430 103002          BCC      1$
238 012432 005237 002202     INC      PFLG          ;NO, Q-BUS THEN
239 012436          1$:
240 012436          ENDINIT
    012436          L10012:
    012436 104011          EMT      C$INIT
241
242 012440          ENDMOD
243
244 012440          BGNMOD  CLNCODE
245
246 012440          BGNCLN
247
248 012440          SETPRI  #PRI07
    012440 012700 000340     MOV      #PRI07,R0
    012444 104041          EMT      C$SPRI
249
250 012446 032777 000200 167460 1$: BIT      #CRDY,@RLCS
251 012454 001774          BEQ      1$
252
253 012456 042777 000100 167450     BIC      #INTEN,@RLCS
254
255 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$:
265 012504          L10013:  ENDCLN
      012504
      012504 104012          EMT      C$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
```

```

304 012544          PRINTF  #FRMT11
      012544 012746 011244  MOV    #FRMT11,-(SP)
      012550 012746 000601  MOV    #1,-(SP)
      012554 010600          MOV    SP,R0
      012556 104017          EMT    C$PNTF
      012560 062706 000004  ADD    #4,SP
305 012564 004737 010422  JSR    PC,LINE1
306 012570          DODU   UNITST          ;DROP THE UNIT
      012570 013700 002132  MOV    UNITST,R0
      012574 104053          EMT    C$DODU
307 012576          DOCLN
      012576 104044          EMT    C$DCLN
308 012600          99$:
309 012600 000205          RTS    R5
310
311
312
313          .SBTTL  ROUTINE TO CHECK FOR CONTROLLER ERRORS
314
315          ;*****
316          ;*THIS ROUTINE WILL CHECK RLCS FOR ERRORS AND PRINT THEM
317          ;*ACCORDINGLY. IT WILL MERGE THE ERROR PRINTOUT WITH THE TEST
318          ;*ERROR MESSAGE.
319          ;*
320          ;*EXAMPLE:  RLCS CONTAINED FOLLOWING ERROR(S):
321          ;*                DRV  OPI  HCRC  HNF
322          ;*                SEEK UNDER INTERRUPT
323          ;*
324          ;*
325          ;*
326          ;*ROUTINE USES R0,R1 AND PICKS HEADER FROM R3
327          ;*
328          ;*          CALL  JSR    R5,CHERR
329          ;*
330          ;*
331          ;*
332
333 012602 005037 002164  CHERR:  CLR    DERFLG          ;CLEAR OUT DRIVE ERROR FLAG
334 012606 032737 176000 002166  BIT    #176000,E.CS      ;ANY ERRORS SET
335 012614 001001          BNE    199$            ;IF YES, INVESTIGATE
336 012616 000205          RTS    R5                ;NO, EXIT
337 012620 023727 002270 000004 199$:  CMP    TMPFNC,#GSTAT      ;FUNCTION-NOP, RESET, GETSTATUS
338 012626 002401          BLT    98$                ;YES, GO CHECK IF ONLY DRIVE ERROR
339 012630 000414          BR     1$                ;YES SERVICE ERROR
340 012632 023727 002270 000002 98$:  CMP    TMPFNC,#WRCHK
341 012640 001410          BEQ    1$
342 012642 013700 002166          MOV    E.CS,R0          ;GET E.CS
343 012646 042700 001777          BIC    #1777,R0
344 012652 022700 140000          CMP    #140000,R0      ;DRIVE ERROR ALONE?
345 012656 001001          BNE    1$                ;NO, GO SERVICE
346 012660 000205          2$:  RTS    R5                ;YES, EXIT
347
348 012662 012701 007705          1$:  MOV    #EM102,R1        ;GET START OF STRING
349 012666 005737 002166          TST    E.CS            ;IS COMPOSITE ERROR SET?(BETTER BE)
350 012672 100003          BPL    99$            ;IT'S NOT SOMETHING IS WRONG
351 012674 004537 013346          JSR    R5,FIX          ;YES, PUT 'COMP' IN STRING
352 012700 003762          COMP

```

```

353 012702 032737 040000 002166 99$: BIT #DERR,E.CS ;DRIVE ERROR SET?
354 012710 001405 BEQ 3$ ;NO, CONTINUE
355 012712 005237 002164 INC DERFLG ;SET DRV ERROR FLAG
356 012716 004537 013346 JSR R5,FIX ;YES, PUT 'DRV' INTO STRING
357 012722 003711 DEMES ;'DRV'
358 012724 032737 020000 002166 3$: BIT #NXM,E.CS ;NON-EXISTENT MEMORY ERROR?
359 012732 001403 BEQ 4$ ;NO, CONTINUE
360 012734 004537 013346 JSR R5,FIX ;YES, PUT 'NXM' INTO STRING
361 012740 003716 NXMMES ;'NXM'
362 012742 032737 002000 002166 4$: BIT #OPI,E.CS ;IS OPI SET?
363 012750 001422 BEQ 6$ ;NO, GO CHECK BITS 11 & 12
364 012752 004537 013346 JSR R5,FIX ;PUT 'OPI' INTO STRING
365 012756 003723 OPIMES ;'OPI'
366 012760 032737 004000 002166 BIT #BIT11,E.CS ;HEADERCRC ERROR?
367 012766 001403 BEQ 5$ ;NO, GO CHECK HEADER NOT FOUND
368 012770 004537 013346 JSR R5,FIX ;GO PUT 'HCRC' IN STRING
369 012774 003730 HCRCMES ;'HCRC'
370 012776 032737 010000 002166 5$: BIT #BIT12,E.CS ;HEADER NOT FOUND?
371 013004 001422 BEQ 8$ ;NO, GO PUT 'CRLF' IN STRING
372 013006 004537 013346 JSR R5,FIX ;PUT 'HNF' IN STRING
373 013012 003736 HNFMES ;'HNF'
374 013014 000416 BR 8$ ;PUT 'CRLF' IN STRING
375 013016 032737 004000 002166 6$: BIT #BIT11,E.CS ;DATA CRC ERROR?
376 013024 001403 BEQ 7$ ;NO, GO CHECK DATA LATE
377 013026 004537 013346 JSR R5,FIX ;PUT 'DCK' IN STRING
378 013032 003743 DCKMES ;'DCK'
379 013034 032737 010000 002166 7$: BIT #BIT12,E.CS ;DATA LATE ERROR?
380 013042 001403 BEQ 8$ ;NO, GO PUT IN 'CRLF'
381 013044 004537 013346 JSR R5,FIX ;PUT 'DLT' IN STRING
382 013050 003750 DLTMES ;'DLT'
383 013052 004537 013346 8$: JSR R5,FIX
384 013056 003755 MSCRLF
385 013060 004537 013346 JSR R5,FIX
386 013064 000000 RESTMS: .WORD 0 ;HEADER FROM TEST
387 013066 105011 CLRB (R1) ;PUT TERMINATOR IN
388
389 013070 ERRDF 300,LF,ERR6
013070 104462 TRAP T$ERCODE
013072 000454 .WORD 300
013074 003760 .WORD LF
013076 010322 .WORD ERR6
390
391 013100 000205 RTS R5 ;EXIT ROUTINE
392
393 .SBTTL LOAD RLCS
394 *****
395 * ROUTINE TO LOAD RLCS WITH FUNCTION TO BE PERFORMED
396 * CALL: JSR R5,LDFUNC
397 * .WORD ;BITS TO BE LOADED, FUNCTION
398 * ;AND INTR ENABLE ONLY
399 *
400
401
402 013102 012537 002210 LDFUNC: MOV (R5)+,LDCSR ;GET BITS TO LOAD
403 013106 005737 002164 TST DERFLG
404 013112 001424 BEQ 98$
405 013114 013746 002154 MOV B.CS,-(SP)

```

```

406 013120 012777 000013 167012      MOV      #13,@RLDA
407 013126 012737 000004 002154      MOV      #GSTAT,B.CS
408 013134 053737 002152 002154      BIS      DRIVE,B.CS
409 013142 013777 002154 166764      MOV      B.CS,@RLCS
410 013150 012637 002154          MOV      (SP)+,B.CS
411 013154 032777 000200 166752 99$:    BIT      #200,@RLCS
412 013162 001774          BEQ      99$
413 013164 010346          98$:    MOV      R3,-(SP)          ;SAVE R3
414 013166 042737 177661 002210      BIC      #177661,LDCSR    ;CLEAR ALL BUT FUNC & INTR EN
415 013174 013737 002210 013320      MOV      LDCSR,FNDFNC    ;SAVE FUNCTION
416 013202 042737 000100 013320      BIC      #INTEN,FNDFNC   ;ONLY FUNCTION
417 013210 013737 013320 002270      MOV      FNDFNC,TMPFNC
418 013216 012703 013322          MOV      #HDRLST,R3      ;GET HEADER LIST
419 013222 006237 013320          ASR      FNDFNC          ;ALIGN TO RIGHT
420 013226 001404          BEQ      2$
421 013230 022323          1$:    CMP      (R3)+,(R3)+    ;BUMP R3 BY 4
422 013232 005337 013320          DEC      FNDFNC          ;FOUND IT
423 013236 001374          BNE      1$              ;NO,KEEP LOOKING
424 013240 032737 000100 002210 2$:    BIT      #INTEN,LDCSR    ;YES,DO WE WANT FLAG OR INTR
425 013246 001401          BEQ      3$              ;FLAG BRANCH
426 013250 005723          TST      (R3)+          ;INTR POINT TO THAT ONE
427 013252 011303          3$:    MOV      (R3),R3        ;SET HEADER
428 013254 010337 013064          MOV      R3,RESTMS      ;SET UP HEADER
429 013260 053737 002152 002210      BIS      DRIVE,LDCSR    ;SELECT DRIVE
430 013266 052737 000200 002210 4$:    BIS      #200,LDCSR      ;CONTROLLER READY
431 013274 013777 002210 166632      MOV      LDCSR,@RLCS
432 013302 004537 013360          JSR      R5,BEFORE
433 013306 042777 000200 166620 5$:    BIC      #200,@RLCS
434 013314 012603          MOV      (SP)+,R3        ;RESTORE R3
435 013316 000205          RTS      R5              ;EXIT
436
437 013320 000000          FNDFNC: .WORD 0
438
439 013322 004043          HDRLST: NOPMES
440 013324 004074          NOPINT
441 013326 004126          WCKMES
442 013330 004166          WCKINT
443 013332 004413          OKHDR:  GSTMES
444 013334 004452          GSTINT
445 013336 004330          SEKMES
446 013340 004361          SEKINT
447 013342 004227          RHDMES
448 013344 004267          RHDINT
449
450          ;*****
451          ;*ROUTINE TO MOVE ASCII STRINGS
452          ;*USES REGISTERS R1 - WHERE STRING IS BEING BUILT
453          ;*
454          ;*      CALL      JSR      R5,FIX
455          ;*      .WORD          ;ADDRESS OF STRING TO MOVE
456
457 013346 012500          FIX:    MOV      (R5)+,R0      ;GET ADDRESS AND MOVE RETURN
458 013350 112021          1$:    MOVB   (R0)+,(R1)+    ;GET BYTE AND UPDATE
459 013352 001376          BNE      1$              ;WATCH 0 BYTE TERMINATOR
460 013354 105741          TSTB   -(R1)            ;BACK UP OVER ZERO BYTE
461 013356 000205          RTS      R5              ;EXIT
462

```

```

463
464
465           ;LOAD REGISTERS BEFORE FUNCTION
466           ;CALL: JSR      R5,BEFORE
467 013360 017737 166550 002154 BEFORE: MOV    @RLCS,B.CS      ;READ CS
468 013366 017737 166544 002156        MOV    @RLBA,B.BA      ;READ BA
469 013374 017737 166540 002160        MOV    @RLDA,B.DA      ;READ DA
470 013402 017737 166534 002162        MOV    @RLMP,B.MP      ;READ MP
471 013410 000205                RTS      R5
472
473
474           ;LOAD REGISTERS AT ERROR
475           ;CALL: JSR      R5,AFTER
476
477 013412 017737 166516 002166 AFTER:  MOV    @RLCS,E.CS      ;READ CS
478 013420 017737 166512 002170        MOV    @RLBA,E.BA      ;READ BA
479 013426 017737 166506 002172        MOV    @RLDA,E.DA      ;READ DA
480 013434 017737 166502 002174        MOV    @RLMP,E.MP      ;READ MP
481 013442 017737 166474 002176        MOV    @RLMP,E.MP1     ;READ MP
482 013450 017737 166466 002200        MOV    @RLMP,E.MP2     ;READ MP
483 013456 000205                RTS      R5
484
485
486
487           .SBTTL  ROUTINE TO CALCULATE CRC
488
489           ;ROUTINE WILL CALCULATE A CRC-16 CRC ON A WORD OF
490           ;1-16 BITS IN LENGTH, RESULT IS RETURNED IN "CALBCC"
491           ;
492           ; CALL: JSR      R5,SIMBCC
493           ; .WORD          ;NUMBER OF BITS (1-16)
494           ; .WORD          ;DATA FOR CRC CALCULATION
495           ; .WORD          ;PREVIOUS OR STARTING CRC
496           ;                ;(SHOULD BE ZEROED FOR START)
497           ;
498           ; ROUTINE USES R0,R1,R2
499 013460 010046 SIMBCC: MOV    R0,-(SP)      ;SAVE R0
500 013462 010146        MOV    R1,-(SP)      ;SAVE R1
501 013464 010246        MOV    R2,-(SP)      ;SAVE R2
502 013466 012537 002224        MOV    (R5)+,TEMP2     ;GET NUMBER OF BITS
503 013472 012537 002226        MOV    (R5)+,TEMP3     ;GET DATA FOR CRC CALCULATION
504 013476 012537 002230        MOV    (R5)+,TEMP4     ;GET STARTING CRC
505 013502 005037 002220 1$: CLR    BCCFBK          ;
506 013506 013700 002230        MOV    TEMP4,R0        ;GET PRESENT CRC
507 013512 006037 002226        ROR    TEMP3          ;ROTATE NEW DATA
508 013516 005500        ADC    R0            ;MERGE NEW WITH OLD
509 013520 032700 000001        BIT    #1,R0         ;BIT 0 SET
510 013524 001402        BEQ    2$            ;IF NOT CONTINUE
511 013526 005137 002220        COM    BCCFBK          ;
512 013532 013700 002214 2$: MOV    XPOLY,R0        ;GET CRC POLYNOMIAL (CRC-16)
513 013536 005100        COM    R0            ;COMPLIMENT POLYNOMIAL
514 013540 040037 002220        BIC    R0,BCCFBK      ;
515 013544 000241        CLC                    ;CLEAR CARRY
516 013546 006037 002230        ROR    TEMP4          ;
517 013552 013700 002220        MOV    BCCFBK,R0      ;
518 013556 013701 002230        MOV    TEMP4,R1      ;
519 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
547 013644          L10016:
548 013644 000002          RTI
549
550          ;ROUTINE TO WAIT FOR DRIVE READY
551 013646 010146          WTDRDY: MOV    R1,-(SP)          ;SAVE R1
552 013650 012701 003720  MOV    #2000.,R1          ;TIME OUT OF 200 MILLISECONDS
553 013654 032777 000001 166252 1$: BIT    #DRDY,@RLCS          ;DRIVE READY?
554 013662 001011          BNE    2$                ;YES, EXIT
555
556 013664          WAITUS #1                ;WAIT A WHILE
557 013664 012700 000001  MOV    #1,R0
558 013670 104027          EMT    C$WTU
559 013672 005301          DEC    R1                ;CHECK IF TIME UP
560 013674 001367          BNE    1$                ;NO, GO CHECK DRIVE READY
561
562 013676          EPRDF 200.,DRTIM,ERR5 ;DRIVE READY DID NOT SET
563 013676 104462          TRAP  T$ERCODE
564 013700 000310          .WORD 200
565 013702 004627          .WORD DRTIM
566 013704 010310          .WORD ERR5
567
568 013706 012601          2$: MOV    (SP)+,R1          ;RESTORE
569 013710 000205          RTS     R5                ;EXIT
570
571          ;ROUTINE TO WAIT FOR CONTROLLER READY
572 013712 010146          WTCRDY: MOV    R1,-(SP)          ;SAVE R1
573 013714 012701 017500  MOV    #8000.,R1          ;WAIT 800 MILLISECONDS
574 013720 032777 000200 166206 1$: BIT    #CRDY,@RLCS          ;CONTROLLER READY
575 013726 001014          BNE    2$                ;YES, EXIT
576 013730          WAITUS #1                ;WAIT A WHILE

```

```

013730 012700 000001      MOV    #1,R0
013734 104027      EMT    C$WTU
569 013736 005301      DEC    R1          ;CHECK IF TIME UP
570 013740 001367      BNE    1$          ;NO GO BACK
571
572 013742 004537 013412      JSR    R5,AFTER    ;GET REGISTERS
573
574 013746          ERRDF  100.,CRTIM,ERR6 ;CONTROLLER TIMED OUT
013746 104462      TRAP  T$ERCODE
013750 000144      .WORD 100
013752 004602      .WORD CRTIM
013754 010322      .WORD ERR6
575
576 013756 000402      BR     3$          ;EXIT
577
578 013760 004537 013412      2$:   JSR    R5,AFTER    ;GET REGISTERS
579 013764 012601      3$:   MOV    (SP)+,R1
580 013766 000205      RTS    R5          ;EXIT
581
582
583
584 013770          ENDMOD
585
586
587
588          .SBTTL  **TEST 1** - RLCS ADDRESSABILITY
589
590 013770          BGNST          ;****START OF TEST****
591 013770          STARS
;*****
592          ;TEST TO SEE IF WE CAN ADDRESS THE CONTROL
593          ;AND STATUS REGISTER. IF WE TRAP WE WILL REPORT
594          ;THE ERROR AND ABORT. AFTER THIS TEST WE ONLY KNOW
595          ;THAT WE CAN ADDRESS THE REGISTER.
596 013770          STARS
;*****
597
598
599 013770 005037 002204      1$:   CLR    TRPFLG      ;CLEAR TRAP OCCURANCE
600 013774          2$:   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$SVEC
014016 062706 000010      ADD    #10,SP
601
602 014022 005777 166106      TST    @RLCS        ;ADDRESS RLCS
603 014026          CLRVEC ERRVEC      ;RELEASE TRAP VECTOR
014026 013700 002216      MOV    ERRVEC,R0
014032 104036      EMT    C$CVEC
604 014034 005737 002204      TST    TRPFLG      ;TRAP OCCURRED???
605 014040 001407          BEQ    3$          ;NO, IKAY PROCEED
606 014042 013737 002134 002240      MOV    RLCS,GDDA1  ;SET UP ERROR DATA
607
608 014050          ERRSF  0.,EM1,ERR1 ;BUS TIMEOUT IN ADDRESSING RLCS
014050 104461      TRAP  T$ERCODE

```

```

014052 000000          .WORD 0
014054 004655          .WORD EM1
014056 J10114          .WORD ERR1
609 014060          3$: CKLOOP          ;CHECK IF /FL:LOE IS SET
014060 104006          EMT C$CLP1
610 014062          ENDTST          ;****END OF TEST****
014062 L10017:
014062 104001          EMT C$ETST

611
612
613          .SBTTL **TEST 2** - RLBA ADDRESSABILITY
614
615 014064          BGN1ST          ;****START OF TEST****
616
617
618 014064          STARS
619          ;:*****
620          ;TEST TO SEE IF WE CAN ADDRESS THE BUS ADDRESS
621          ;REGISTER. IF WE TRAP WE WILL REPORT THE ERROR
622          ;AND ABORT. AFTER THIS TEST WE ONLY KNOW THAT
623 014064          ;WE CAN ADDRESS THE REGISTER.
624          ;STARS
625          ;:*****
625 014064 005037 002204 1$: CLR TRPFLG          ;CLEAR TRAP OCCURANCE
626 014070          2$: 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

627
628 014116 005777 166014 TST @RLBA          ;ADDRESS RLBA
629 014122          CLRVEC ERRVEC          ;RELEASE TRAP VECTOR
014122 013700 002216 MOV ERRVEC,R0
014126 104036          EMT C$CVEC
630 014130 005737 002204 TST TRPFLG          ;TRAP OCCURRED???
631 014134 001407          BEQ 3$          ;NO, CONTINUE
632 014136 013737 002136 002240 MOV RLBA,GDDAT      ;SETUP ERROR DATA
633
634 014144          ERRSF 1,EM2,ERR1          ;BUS TIMEOUT IN ADDRESSING RLBA
014144 104461          TRAP T$ERCODE
014146 000001          .WORD 1
014150 004702          .WORD EM2
014152 010114          .WORD ERR1
635 014154          3$: CKLOOP          ;CHECK IF /FL:LOE IS SET
014154 104006          EMT C$CLP1
636 014156          ENDTST          ;****END OF TEST****
014156 L10020:
014156 104001          EMT C$ETST

637
638
639          .SBTTL **TEST 3** - RLDA ADDRESSABILITY
640
641 014160          BGN1ST          ;****START OF TEST****
642 014160          STARS

```

```
643 ;*****  
644 ;TEST TO SEE IF WE CAN ADDRESS THE DISK ADDRESS  
645 ;REGISTER IF WE TRAP WE WILL REPORT THE ERROR  
646 ;AND ABORT. AFTER THIS TEST WE ONLY KNOW THAT  
647 014160 ;WE CAN ADDRESS THE REGISTER.  
STARS  
;*****  
648  
649  
650 014160 005037 002204 1$: CLR TRPFLG ;CLEAR TRAP OCCURANCE  
651 014164 2$: 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$SVEC  
014206 062706 000010 ADD #10,SP  
652  
653 014212 005777 165722 TST @RLDA ;ADDRESS RLDA  
654 014216 013700 002216 CLRVEC ERRVEC ;RELEASE TRAP VECTOR  
014222 104036 MOV ERRVEC,R0  
655 014224 005737 002204 EMT C$CVEC  
656 014230 001407 TST TRPFLG ;TRAP OCCURRED???  
657 BEQ 3$ ;NO, CONTINUE  
658 014232 013737 002140 002240 MOV RLDA,GDDAT ;SETUP ERROR INFO  
659 014240 ERRSF 2,EM3,ERR1 ;BUS TIMEOUT IN ADDRESSING RLDA  
014240 104461 TRAP T$ERCODE  
014242 000002 .WORD 2  
014244 004727 .WORD EM3  
014246 010114 .WORD ERR1  
660 014250 3$: CKLOOP ;CHECK IF /FL:LOE IS SET  
014250 104006 EMT C$CLP1  
661 014252 ENDTST ;****END OF TEST****  
014252 L10021:  
014252 104001 EMT C$ETST  
662  
663  
664 .SBTTL **TEST 4** - RLMP ADDRESSABILITY  
665  
666 014254 BGNTST ;****START OF TEST****  
667 014254 STARS  
;*****  
668 ;TEST TO SEE IF WE CAN ADDRESS THE MULTIPURPOSE  
669 ;REGISTER. IF WE TRAP WE WILL REPORT THE ERROR AND  
670 ;ABORT. AFTER THIS TEST WE ONLY KNOW THAT WE CAN  
671 ;ADDRESS THE REGISTER.  
672 014254 STARS  
;*****  
673  
674  
675 014254 005037 002204 1$: CLR TRPFLG ;CLEAR TRAP OCCURANCE  
676 014260 2$: 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$SVEC
014302 062706 000010   ADD      #10,SP
677
678 014306 005777 165630   TST      @RLMP          ;ADDRESS RLMP
679 014312          CLRVEC   ERRVEC        ;RELEASE TRAP VECTOR
    014312 013700 002216   MOV      ERRVEC,R0
    014316 104036          EMT      C$CVEC
680 014320 005737 002204   TST      TRPFLG        ;TRAP OCCURRED???
681 014324 001407          BEQ      3$            ;NO, CONTINUE
682 014326 013737 002142 002240   MOV      RLMP,GDDAT    ;SET UP ERROR INFO
683
684 014334          ERRSF   3.,EM4,ERR1 ;BUS TIMEOUT IN ADDRESSING RLMP
    014334 104461          TRAP    T$ERCODE
    014336 000003          .WORD   3
    014340 004754          .WORD   EM4
    014342 010114          .WORD   ERR1
685 014344          3$:    CKLOOP   ;CHECK IF /FL:LOE IS SET
    014344 104006          EMT      C$CLP1
686 014346          ENDTST  ;****END OF TEST****
    014346          L10022:
    014346 104001          EMT      C$ETST
687
688
689          .SBTTL  **TEST 5** - READ WRITE OF RLCS
690
691 014350          BGNST   ;****START OF TEST****
692
693
694
695 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.
    STARS
    ;*****
701
702
703 014350 012703 002646          MOV      #CSPAT,R3    ;SET UP TABLE POINTER OF PATTERNS
704
705 014354          BGNSEG   ;****START OF SEGMENT****
    014354 104004          EMT      C$BSEG
706
707 014356          CSTEST:
708 014356 011337 002240          MOV      (R3),GDDAT   ;GET PATTERN INTO GDDAT
709 014362 052737 000200 002240   BIS      #200,GDDAT   ;INSURE GO IS SET
710 014370 013777 002240 165536   MOV      GDDAT,@RLCS ;LOAD RLCS (CONTROL AND STATUS)
711 014376 032777 040000 165530   BIT      #DERR,@RLCS ;IF DRIVE ERROR PRESENT
712 014404 001403          BEQ      99$          ;THEN EXPECT DRIVE AND
713 014406 052737 140000 002240   BIS      #ERR!DERR,GDDAT ;COMPOSITE ERROR
714 014414 017737 165514 002242 99$:  MOV      @RLCS,BDDAT  ;READ RLCS BACK
715 014422 042737 000001 002242   BIC      #DRDY,BDDAT  ;IGNORE DRIVE READY
716 014430 023737 002240 002242   CMP      GDDAT,BDDAT  ;DID WE READ WHAT WE LOADED
717 014436 001404          BEQ      1$          ;YES, THEN BRANCH
718
719 014440          ERRDF   4.,EM5,ERR2 ;WRONG DATA IN RLCS
```

```

014440 104462          TRAP      T$ERCODE
014442 000004          .WORD      4
014444 005001          .WORD      EM5
014446 010126          .WORD      ERR2
720 014450          1$:      ESCAPE   SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
014450 104010          EMT      C$ESCAPE
014452 000012          .WORD      10000$-.

721
722
723 014454 005723          TST      (R3)+          ;BUMP FOR NEXT PATTERN
724 014456 020327 002744      CMP      R3,#CSEND      ;CHECK FOR END
725 014462 001335          BNE      C$TEST        ;NOT END, LOAD NEXT PATTERN
726
727 014464          ENDSEG          ;****END OF SEGMENT****
014464 10000$:
014464 104005          EMT      C$ESEG
728 014466          ENDTST        ;****END OF TEST****
014466 L10023:
014466 104001          EMT      C$ETST

729
730
731          .SBTTL   **TEST 6** - READ WRITE OF RLBA
732
733 014470          BGNST          ;****START OF TEST****
734
735 014470          STARS
;:*****
736          ;TEST THAT WE CAN WRITE/READ BITS IS THRU 1 OF THE
737          ;BUS ADDRESS REGISTER. FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
738          ;GROWING 0 AND SHIFTING 0. BIT 0 IS ALSO LOADED BUT
739          ;SHOULD ALWAYS COME BACK AS 0
740 014470          STARS
;:*****

741
742
743 014470 012703 002272          BGNSEGE      MOV      #BEGPAT,R3          ;GET START OF PATTERN LIST
744 014474          BGNSEGE      EMT      C$BSEG          ;****START OF SEGMENT****
014474 104004
745 014476          BATEST:
746 014476 011337 002240          MOV      (R3),GDDAT      ;GET PATTERN TO SEND
747 014502 005737 002266          TST      T.CNTR          ;RL11??
748 014506 001403          BEQ      2$              ;NO,
749 014510 042737 000001 002240          BIC      #BIT0,GDDAT      ;KEEP RLBA EVEN (UNIBUS)
750 014516 013777 002240 165412 2$:      MOV      GDDAT,@RLBA      ;LOAD PATTERN TO BUS ADDRESS
751 014524 017737 165406 002242          MOV      @RLBA,BDDAT      ;READ IT BACK
752 014532 023737 002240 002242          CMP      GDDAT,BDDAT      ;IS IT CORRECT?
753 014540 001404          BEQ      1$              ;IF SO, BRANCH
754
755 014542          ERRDF      5.,EM6,ERR2          ;DATA WRONG IN RIBA
014542 104462          TRAP      T$ERCODE
014544 000005          .WORD      5
014546 005052          .WORD      EM6
014550 010126          .WORD      ERR2
756 014552          1$:      ESCAPE   SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
014552 104010          EMT      C$ESCAPE
014554 000012          .WORD      10000$-.
  
```

```
1
2
3 014556 005723          TST      (R3)+          ;BUMP FOR NEXT PATTERN
4 014560 020327 002500  CMP      R3,#ENDPAT      ;CHECK FOR END
5 014564 001344          BNE      BATEST          ;NOT END, BRANCH FOR NEXT
6
7 014566          ENDSEG          ;****END OF SEGMENT****
  014566          10000$:
8 014570 104005          EMT      C$ESEG          ;****END OF TEST****
  014570          L10024:
  014570 104001          EMT      C$ETST
9
10
11          .SBTTL  **TEST 7** - READ WRITE OF RLDA
12
13 014572          BGNTEST          ;****START OF TEST****
14
15 014572          STARS
  ;*****
16          ;TEST THAT WE CAN WRITE/READ THE DISK ADDRESS REGISTER
17          ;ALL BIT POSITIONS ARE WRITTEN USING FOUR PATTERNS:
18          ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
19 014572          STARS
  ;*****
20
21
22 014572 012703 002272          BGNSEG  MOV      #BEGPAT,R3      ;SET UP POINTER TO PATTERN LIST
23 014576          104004          EMT      C$BSEG          ;****START OF SEGMENT****
  014576          DATEST:
24 014600          011337 002240          MOV      (R3),GDDAT          ;GET PATTERN
25 014600 013777 002240 165326          MOV      GDDAT,@RLDA        ;LOAD PATTERN IN DA
26
27
28 014612 017737 165322 002242          MOV      @RLDA,BDDAT        ;READ PATTERN BACK
29 014620 023737 002240 002242          CMP      GDDAT,BDDAT        ;IS IT CORRECT?
30 014626 001404          BEQ      1$                ;BRANCH IF CORRECT
31
32 014630          ERRDF  6.,EM7,ERR2          ;WRONG DATA IN RLDA
  014630 104462          TRAP  T$ERCODE
  014632 000006          .WORD  6
  014634 005100          .WORD  EM7
  014636 010126          .WORD  ERR2
33 014640          1$:  ESCAPE  SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
  014640 104010          EMT      C$ESCAPE
  014642 000012          .WORD  10000$-.
34
35
36 014644 005723          TST      (R3)+          ;BUMP POINTER
37 014646 020327 002500  CMP      R3,#ENDPAT      ;AT END OF PATTERNS?
38 014652 001352          BNE      DATEST          ;NO, BRANCH BACK
39
40 014654          ENDSFG          ;****END OF SEGMENT****
  014654          10000$:
  014654 104005          EMT      C$ESEG          ;****END OF TEST****
41 014656          ENDTST          ;****END OF TEST****
  014656          L10025:
```

```
014656 104001          EMT      C$ETST
42
43
44          .SBTTL  **TEST 8** - BIS OF RLCS
45
46 014660          BGNTST          ;****START OF TEST****
47 014660          STARS
:*****
48          :TEST THAT WE CAN USE THE 'BIS' INSTRUCTION ON THE CONTROL
49          :AND STATUS REGISTER. BITS 8,9 AND 6-1 ARE TESTED TO
50          :SET INDIVIDUALLY AS WELL AS COLLECTIVELY WITHOUT DESTROYING
51          :ANY PREVIOUS DATA PATTERN
52 014660          STARS
:*****
53
54
55 014660 012703 002646          MOV      #CSPAT,R3          ;GET BEGINNING OF LIST
56 014664          BGNSEG          ;****START OF SEGMENT****
014664 104004          EMT      C$BSEG
57 014666          1$:
58 014666 012777 000200 165240          MOV      #CRDY,@RLCS          ;INSURE GO IS THERE
59 014674 011337 002240          MOV      (R3),GDDAT          ;SET UP EXPECTED RLCS
60 014700 052737 000200 002240          BIS      #CRDY,GDDAT          ;IN GDDAT
61 014706 051377 165222          BIS      (R3),@RLCS          ;BIT SET PATTERN IN RLCS
62 014712 032777 040000 165214          BIT      #DERR,@RLCS          ;IF ERROR BIT SET THEN
63 014720 001403          BEQ      99$          ;EXPECT IT ON THE READ
64 014722 052737 140000 002240          BIS      #ERR!DERR,GDDAT          ;BACK
65 014730 017737 165200 002242 99$:          MOV      @RLCS,BDDAT          ;READ RLCS TO CHECK 'BIS'
66 014736 042737 000001 002242          BIC      #DRDY,BDDAT          ;CLEAR OUT DRIVE READY
67 014744 023737 002242 002240          CMP      BDDAT,GDDAT          ;DID BIS WORK?
68 014752 001404          BEQ      2$          ;BRANCH IF OKAY
69
70 014754          ERRDF  7,EM61,ERR2          ;WRONG DATA IN RLCS
014754 104462          TRAP  T$ERCODE
014756 000007          .WORD  7
014760 006575          .WORD  EM61
014762 010126          .WORD  ERR2
71 014764          2$:          ESCAPE  SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
014764 104010          EMT      C$ESCAPE
014766 000012          .WORD  10000$-.          ;BIT OR CLEARED OTHER BIT
72
73
74 014770 005723          TST      (R3)+          ;GET NEXT PATTERN
75 014772 022703 002744          CMP      #CSEND,R3          ;AT END OF LIST
76 014776 001333          BNE      1$          ;NO GO BACK FOR TEST OF
77          ;NEXT PATTERN
78          ENDSEG          ;****END OF SEGMENT****
015000 10000$:          EMT      C$ESEG
79 015002          ENDTST          ;****END OF TEST****
015002 L10026:          EMT      C$ETST
015002 104001
80
81
82          .SBTTL  **TEST 9** - BIC OF RLCS
83
84 015004          BGNTST          ;****START OF TEST****
```

```
85
86 015004          STARS
                   ;*****
87                   ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE
88                   ;CONTROL AND STATUS REGISTER. BITS 8-9 AND 6-1 ARE
89                   ;TESTED.
90 015004          STARS
                   ;*****
91
92
93 015004 012703 002646      BGNSEG      MOV      #CSPAT,R3      ;GET BEGINNING OF PATTERNS
94 015010          EMT          C$BSEG      ;****START OF SEGMENT****
95 015012          1$:
96 015012 012777 001776 165114      MOV      #1776,@RLCS      ;SET ALL SETTABLE BITS
97 015020 012737 001776 002240      MOV      #1776,GDDAT      ;SET UP EXPECT DATA IN
98 015026 041337 002240          BIC      (R3),GDDAT      ;GDDAT
99 015032 041377 165076          BIC      (R3),@RLCS      ;CLEAR BITS IN RLCS VIA "BIC"
100 015036 032777 040000 165070      BIT      #DERR,@RLCS      ;IF DRIVE ERROR BIT SET
101 015044 001403          BEQ      99$      ;EXPECT IT SET WHEN WE
102 015046 052737 140000 002240      BIS      #ERR!DERR,GDDAT ;READ IT BACK
103 015054 017737 165054 002242      99$:    MOV      @RLCS,BDDAT      ;MOVE RLCS TO BDDAT FOR COMPARE
104 015062 042737 000001 002242      BIC      #DRDY,BDDAT      ;CLEAR DRIVE READY
105 015070 023737 002242 002240      CMP      BDDAT,GDDAT      ;DID "BIC" WORK PROPERLY
106 015076 001404          BEQ      2$      ;BRANCH IF OKAY
107
108 015100          ERRDF      8.,EM62,ERR2      ;WRONG DATA IN RLCS
109 015100 104462          TRAP      T$ERCODE
110 015102 000010          .WORD      8
111 015104 006656          .WORD      EM62
112 015106 010126          .WORD      ERR2
113 015110          2$:    ESCAPE      SEG      ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
114 015110 104010          EMT          C$ESCAPE
115 015112 000012          .WORD      10000$-.
116
117
118
119
120 015114 005723          TST      (R3)+      ;GET NEXT PATTERN
121 015116 020327 002744      CMP      R3,#CSEND      ;AT END OF LIST
122 015122 001333          BNE      1$      ;NO, GO BACK WITH NEXT PATTERN
123 015124          ENDSEG      ;****END OF SEGMENT****
124 015124 10000$:
125 015124 104005          EMT          C$ESEG
126 015126          ENDTST      ;****END OF TEST****
127 015126 104001          L10027:  EMT          C$ETST
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
```

```
128  
129  
130 015130 012703 002272  
131 015134  
131 015134 104004  
132 015136  
133 015136 005077 164774  
134 015142 011337 002240  
135 015146 005737 002266  
136 015152 001403  
137 015154 042737 000001 002240  
138 015162 051377 164750  
139 015166 017737 164744 002242  
140 015174 023737 002242 002240  
141 015202 001404  
142  
143 015204  
143 015204 104462  
143 015206 000011  
143 015210 006741  
143 015212 010126  
144 015214  
144 015214 104010  
144 015216 000012  
145  
146 015220 005723  
147 015222 020327 002500  
148 015226 001343  
149 015230  
149 015230  
149 015230 104005  
150 015232  
150 015232  
150 015232 104001  
151  
152  
153  
154  
155 015234  
156  
157 015234  
158  
159  
160  
161 015234  
162  
163  
164 015234 012703 002272  
165 015240  
165 015240 104004  
166 015242  
167 015242 012777 177776 164666  
168 015250 012737 177776 002240  
169 015256 041337 002240
```

```
;;*****  
BGNSEG MOV #BEGPAT,R3 ;GET START OF LIST  
;*****START OF SEGMENT****  
1$: EMT C$BSEG  
CLR @RLBA ;CLEAR 'BA'  
MOV (R3),GDDAT ;SET EXPECTED  
TST T.CNTRL ;RL11  
BEQ 3$ ;NO  
BIC #1,GDDAT ;BIT 0 CAN'T SET IN RLBA (UNIBUS)  
3$: BIS (R3),@RLBA ;BIS RLBA WITH PATTERN  
MOV @RLBA,BDDAT ;READ 'BA'  
CMP BDDAT,GDDAT ;DID RLBA LOAD PROPERLY?  
BEQ 2$ ;BRANCH IF YES  
ERRDF 9.,EM63,ERR2 ;WRONG DATA IN RLBA  
TRAP T$ERCODE  
.WORD 9  
.WORD EM63  
.WORD ERR2  
2$: ESCAPE SEG ;IF /FL:LOE SET LOOP, ELSE EXIT SEG  
EMT C$ESCAPE  
.WORD 10000$-  
TST (R3)+ ;GET NEXT PATTERN  
CMP R3,#ENDPAT ;DID WE COMPLETE LIST  
BNE 1$ ;NO, GO BACK FOR NEXT.  
ENDSEG ;*****END OF SEGMENT****  
10000$: EMT C$ESEG  
ENDTST ;*****END OF TEST****  
L10030: EMT C$ETST  
;*****  
.SBTTL **TEST 11** - BIC OF RLBA  
BGNTEST ;*****START OF TEST****  
STARS  
;*****  
;TEST THAT THE 'BIC' INSTRUCTION WILL WORK ON THE BUS  
;ADDRESS REGISTER. BITS 15-1 ARE TESTED WITH 4 PATTERNS  
;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0.  
STARS  
;*****  
BGNSEG MOV #BEGPAT,R3 ;GET START OF LIST  
;*****START OF SEGMENT****  
1$: EMT C$BSEG  
MOV #-2,@RLBA ;SET RLBA TO ALL 1'S (BIT 0=0)  
MOV #-2,GDDAT ;SET UP EXPECTED RESULTS  
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
    015330 10000$:        .WORD    10000$-.
182 015332                      EMT      C$ESEG
    015332 104005          ENDTST
    015332 100031:        .WORD    100031
    015332 104001          EMT      C$ETST
183
184
185                      .SBITL  **TEST 12** - BIS OF RLDA
186
187 015334                      BGNST          ;****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          BGNSEG    MOV      #BEGPAT,R3      ;GET START OF LIST
197 015340                      EMT      C$BSEG          ;****START OF SEGMENT****
    015340 104004          1$:
198 015342                      CLR      @RLDA          ;CLEAR "DA"
199 015342 005077 164572          MOV      (R3),GDDAT    ;SET EXPECTED
200 015346 011337 002240          BIS      (R3),@RLDA    ;BIS RLDA
201 015352 051377 164562          MOV      @RLDA,BDDAT   ;READ RLDA
202 015356 017737 164556 002242    CMP      BDDAT,GDDAT   ;IS RLDA CORRECT
203 015364 023737 002242 002240    BEQ      2$             ;IF OKAY BRANCH
204 015372 001404
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$ESCAPE
    015406 000012        .WORD    10000$-.

```

```
208
209 015410 005723          TST      (R3)+      ;GET NEXT PATTERN
210 015412 020327 002500  CMP      R3,#ENDPAT ;HAVE WE FINISHED?
211 015416 001351          BNE      1$         ;NO GO BACK
212 015420          ENDSEG          ;****END OF SEGMENT****
      015420          10000$:
213 015422          EMT      C$ESEG
      015422 104005          ;****END OF TEST****
      015422          L10032:
      015422 104001          EMT      C$ETST

214
215
216      .SBTTL  **TEST 13** - BIC OF RLDA
217
218 015424          BGN:TST          ;****START OF TEST****
219
220 015424          STARS
      ;:*****
221          ;TEST THAT THE "BIC" INSTRUCTION WORKS ON THE DISK
222          ;ADDRESS REGISTER. ALL BITS ARE TESTED WITH FOUR
223          ;PATTERNS: GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
224 015424          STARS
      ;:*****

225
226
227 015424 012703 002272  BGN:SEG  MOV      #BEGPAT,R3      ;GET START OF LIST
228 015430          EMT      C$BSEG          ;****START OF SEGMENT****
      015430 104004          1$:
229 015432          MOV      #-1,@RLDA      ;SET RLDA TO ALL 1'S
230 015432 012777 177777 164500  MOV      #-1,GDDAT      ;SET EXPECTED DATA
231 015440 012737 177777 002240  BIC      (R3),GDDAT      ;SET EXPECTED DATA
232 015446 041337 002240          BIC      (R3),@RLDA      ;"BIC" RLDA
233 015452 041377 164462          MOV      @RLDA,BDDAT      ;READ RLDA
234 015456 017737 164456 002242  CMP      GDDAT,BDDAT      ;DID "BIC" WORK?
235 015464 023737 002240 002242  BEQ      2$         ;IF IT DID BRANCH
236 015472 001404
237
238 015474          ERRDF  12.,EM66,ERR2      ;WRONG DATA IN RLDA
      015474 104462          TRAP  T$ERCODE
      015476 G00014          .WORD  12
      015500 007166          .WORD  EM66
      015502 010126          .WORD  ERR2
239 015504          2$:  ESCAPE  SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
      015504 104010          EMT      C$ESCAPE
      015506 000012          .WORD  10000$-.

240
241 015510 005723          TST      (R3)+      ;GET NEXT PATTERN
242 015512 020327 002500  CMP      R3,#ENDPAT      ;DONE?
243 015516 001345          BNE      1$         ;NO GO BACK
244 015520          ENDSEG          ;****END OF SEGMENT****
      015520          10000$:
245 015522          EMT      C$ESEG
      015522 104005          ;****END OF TEST****
      015522          L10033:
      015522 104001          EMT      C$ETST

246
247
```

```
248 .SBTTL **TEST 14** - BUS RESET OF RLCS
249
250 015524 BGNST ;****START OF TEST****
251
252 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.
253 STARS
254 ;*****
255
256
257
258
259
260
261 015524
262
263
264 015524 SETPRI #PRI07 ;PRIORITY TO SEVEN
015524 012700 000340 MOV #PRI07,RO
015530 104041 EMT C$SPRI
265 015532 012777 000377 164374 MOV #377,@RLCS ;LOAD ALL RLCS LOADABLE BITS
266 015540 012737 000200 002240 MOV #CRDY,GDDAT ;SETUP EXPECTED
267 015546 032777 040000 164360 BIT #DERR,@RLCS ;DRIVE ERR SET?
268 015554 001403 BEQ 1$ ;IF NOT DON'T EXPECT IT
269 015556 052737 140000 002240 BIS #DERR!ERR,GDDAT ;IT'S SET, INIT BETTER NOT CLR
270 015564 012700 000100 1$: MOV #100,RO ;SET UP A WAIT LOOP
271 015570 BRESET ;BUS RESET
015570 104033 EMT C$RESET
272 015572 005300 2$: DEC RO ;WAIT IN CASE OF DRIVE ERROR
273 015574 001376 BNE 2$
274 015576 017737 164332 002242 MOV @RLCS,BDDAT ;READ RLCS
275 015604 042737 000001 002242 BIC #DRDY,BDDAT ;CLEAR OUT DRDY - DON'T CARE
276 015612 023737 002242 002240 CMP BDDAT,GDDAT ;DID INIT WORK
277 015620 001404 BEQ 3$ ;YES, BRANCH
278
279 015622 ERRDF 13,EM67,ERR2 ;WRONG DATA IN RLCS
015622 104462 TRAP T$ERCODE
015624 000015 .WORD 13
015626 007251 .WORD EM67
015630 010126 .WORD ERR2
280 015632 3$:
281 015632 ENDTST ;****END OF TEST****
015632 L10034:
015632 104001 EMT C$ETST
282
283
284 .SBTTL **TEST 15** - BUS RESET OF RLBA
285
286 015634 BGNST ;****START OF TEST****
287
288 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
289 STARS
290 ;*****
291
292 015634
```

```

293
294
295 015634 012777 177776 164274      MOV      #-2,@RLBA      ;SET BA TO ALL 1'S
296 015642 005737 002266              TST      T.CNTRLR      ;RL1??
297 015646 001403                      BEQ      2$            ;NO
298 015650 052777 000001 164260      BIS      #1,@RLBA
299 015656 005037 002240      2$:    CLR      GDDAT      ;CLEAR EXPECTED DATA
300 015662                      BRESET   ;ISSUE BUS INIT
      015662 104033
301 015664 017737 164246 002242      EMT      C$RESET
302 015672 001404                      MOV      @RLBA,BDDAT  ;READ RLBA
303                      BEQ      1$            ;IF CLEAR BRANCH
304 015674                      ERRDF   14.,EM70,ERR2 ;WRONG DATA IN RLBA
      015674 104462
      015676 000016
      015700 007306
      015702 010126
305 015704      1$:
306
307 015704      ENDTST                      ;****END OF TEST****
      015704
      015704 104001      L10035:
308                      EMT      C$ETST
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
324 015722 017737 164212 002242      EMT      C$RESET
325 015730 001404                      MOV      @RLDA,BDDAT  ;READ RLDA
326                      BEQ      1$            ;IF CLEAR BRANCH
327 015732                      ERRDF   15.,EM71,ERR2 ;WRONG DATA IN RLDA
      015732 104462
      015734 000017
      015736 007343
      015740 010126
328 015742      1$:
329
330 015742      ENDTST                      ;****END OF TEST****
      015742
      015742 104001      L10036:
331                      EMT      C$ETST
332
```

```

333      .SBTTL  **TEST 17** - UNIQUENESS OF RLCS
334
335 015744      BGNTST                      ;****START OF TEST****
336
337 015744      STARS
338      :*****
339      :TEST THE UNIQUENESS OF THE CONTROL AND STATUS
340      :REGISTER.  THE RLBA AND RLDA ARE PRELOADED WITH
341      :177776 AND 177777 RESPECTIVELY.  THE RLCS IS THEN
342      :LOADED TO INSURE THAT NEITHER THE RLBA OR RLDA
343 015744      :ARE MODIFIED BY THE WRITING OF THE RLCS.
344      :*****
345
346 015744 012737 000201 002210      MOV      #DRDY!CRDY,LDCSR      ;SET DRIVE AND CONTROLLER READY
347 015752 012777 177776 164156      MOV      #-2,@RLBA          ;SET RLBA TO ALL 1'S
348 015760 012777 177777 164152      MOV      #-1,@RLDA          ;SET RLDA TO ALL 1'S
349 015766 013777 002210 164140      MOV      LDCSR,@RLCS        ;WRITE RLCS
350
351      :CHECK THAT RLBA REMAINED UNEFFECTED
352
353 015774 022777 177776 164134      CMP      #-2,@RLBA          ;RLBA OKAY?
354 016002 001412                      BEQ      1$                  ;YES, GO CHECK DA
355
356 016004 012737 177776 002240      MOV      #-2,GDDAT          ;SET UP EXPECTED
357 016012 017737 164120 002242      MOV      @RLBA,BDDAT        ;READ RLBA
358
359 016020                      ERRDF  16.,EM72,ERR2      ;CS MODIFIED BA
360      016020 104462                      TRAP   T$ERCODE
361      016022 000020                      .WORD  16
362      016024 007400                      .WORD  EM72
363      016026 010126                      .WORD  ERR2
364 016030 1$:  CKLOOP                      ;CHECK IF /FL:LOE IS SET
365      016030 104006                      EMT    C$CLP1
366
367 016032 022777 177777 164100      CMP      #-1,@RLDA          ;RLDA OKAY?
368 016040 001412                      BEQ      2$                  ;YES, CONTINUE
369
370 016042 012737 177777 002240      MOV      #-1,GDDAT          ;SET UP EXPECTED
371 016050 017737 164064 002242      MOV      @RLDA,BDDAT        ;READ DA
372
373 016056                      ERRDF  17.,EM73,ERR2      ;CS MODIFIED DA
374      016056 104462                      TRAP   T$ERCODE
375      016060 000021                      .WORD  17
376      016062 007433                      .WORD  EM73
377      016064 010126                      .WORD  ERR2
378
379 016066 2$:
380
381
382 016066      ENDTST                      ;****END OF TEST****
383 016066      L10037:
384 016066 104001      EMT    C$ETST
385
386      .SBTTL  **TEST 18** - UNIQUENESS OF RLBA
  
```



```

421
422 016230          STARS
                    ;*****
423                    ;TEST THE UNIQUENESS OF THE DISK ADDRESS REGISTER.  THE RLCS
424                    ;AND RLBA ARE LOADED WITH XXX20X AND 177776
425                    ;RESPECTIVELY.  THE RLDA IS THEN WRITTEN TO INSURE
426                    ;THAT NEITHER THE RLCS OR THE RLBA ARE MODIFIED
427                    ;BY WRITING THE RLDA.
428 016230          STARS
                    ;*****
429
430
431 016230 012737 000200 002240          MOV      #CRDY,GDDAT      ;CONTROLLER READY
432 016236 032777 040000 163670          BIT      #DERR,@RLCS      ;IF DRIVE ERROR SET
433 016244 001403                                BEQ      99$              ;THEN EXPECT IT LATER
434 016246 052737 140000 002240          BIS      #ERR!DERR,GDDAT
435 016254 013777 002240 163652 99$:   MOV      GDDAT,@RLCS      ;LOAD CS
436 016262 012777 177776 163646          MOV      #-2,@RLBA      ;LOAD BA WITH ALL 1'S
437 016270 005077 163644          CLR      @RLDA          ;CLEAR RLDA
438
439                    ;CHECK IF RLCS IS OKAY
440
441 016274 017737 163634 002242          MOV      @RLCS,BDDAT      ;READ RLCS
442 016302 042737 000001 002242          BIC      #DRDY,BDDAT      ;IGNORE DRIVE READY
443 016310 023737 002240 002242          CMP      GDDAT,BDDAT      ;RLCS OKAY?
444 016316 001404                                BEQ      1$              ;YES, THEN BRANCH
445
446 016320          ERRDF 20.,EM76,ERR2      ;DA MODIFIED CS
447 016320 104462          TRAP  T$ERCODE
448 016322 000024          .WORD 20
449 016324 007552          .WORD EM76
450 016326 010126          .WORD ERR2
451
452 016330 1$:   CKLOOP ;CHECK IF /FL:LOE IS SET
453 016330 104006          EMT      C$CLP1
454
455 016332 022777 177776 163576          CMP      #-2,@RLBA      ;IS RLBA OKAY?
456 016340 001412          BEQ      2$              ;BRANCH IF OKAY
457
458
459 016342 012737 177776 002240          MOV      #-2,GDDAT      ;SET UP EXPECTED
460 016350 017737 163562 002242          MOV      @RLBA,BDDAT      ;READ RLBA
461
462
463 016356          ERRDF 21.,EM77,ERR2      ;DA MODIFIED BA
464 016356 104462          TPAP  T$ERCODE
465 016360 000025          .WORD 21
466 016362 007605          .WORD EM77
467 016364 010126          .WORD ERR2
468
469 016366          2$:
470
471
472 016366          ENDTST ;****END OF TEST****
473 016366 L10041:
474 016366 104001          EMT      C$ETST
475
476
477 .SBTTL **TEST 20** - UNIQUENESS OF RLMP
478
479 BGN1ST ;****START OF TEST****
480
481
482
483 016370
484

```

```

465
466 016370          STARS
                    ;*****
467                    ;TEST THE UNIQUENESS OF THE MULTI-PURPOSE REGISTER
468                    ;WE WILL WRITE THE RLCS, RLBA, AND THE RLDA, THEN THE
469                    ;RLMP IS WRITTEN. WE THEN GO BACK AND VERIFY THE CONTENTS
470                    ;OF THE RLCS, RLBA, RLDA.
471 016370          STARS
                    ;*****
472
473
474 016370 012737 000200 002240          MCV      #CRDY,GDDAT      ;CONTROLLER READY
475 016376 032777 040000 163530          BIT      #DERR,@RLCS      ;IF DRIVE ERROR SET
476 016404 001403                                BEQ      99$              ;THE EXPECT IT LATER
477 016406 052737 140000 002240          BIS      #ERR!DERR,GDDAT
478 016414 013777 002240 163512 99$:   MOV      GDDAT,@RLCS      ;LOAD CS
479 016422 012777 177776 163506          MOV      #-2,@RLBA      ;LOAD BA WITH ALL 1'S
480 016430 012777 177777 163502          MOV      #-1,@RLDA      ;LOAD RLDA
481 016436 005077 163500          CLR      @RLMP          ;WRITE RLMP
482
483                    ;CHECK IF RLCS IS OKAY
484
485 016442 017737 163466 002242          MOV      @RLCS,BDDAT      ;READ RLCS
486 016450 042737 000001 002242          BIC      #DRDY,BDDAT      ;IGNORE DRIVE READY
487 016456 023737 002240 002242          CMP      GDDAT,BDDAT      ;RLCS OKAY?
488 016464 001404                                BEQ      1$              ;YES, THEN BRANCH
489
490 016466                                ERRDF   201.,EM44,ERR2      ;MP MODIFIED CS
491 016466 104462                                TRAP   T$ERCODE
492 016470 000311                                .WORD  201
493 016472 006121                                .WORD  EM44
494 016474 010126                                .WORD  ERR2
495
496 016476 104006 1$:   CKLOOP                                ;CHECK IF /FL:LOE IS SET
497 016476                                EMT    C$CLP1
498
499 016500 022777 177776 163430          CMP      #-2,@RLBA      ;IS RLBA OKAY?
500 016506 001412                                BEQ      2$              ;BRANCH IF OKAY
501
502 016510 012737 177776 002240          MOV      #-2,GDDAT      ;SET UP EXPECTED
503 016516 017737 163414 002242          MOV      @RLBA,BDDAT      ;READ RLBA
504
505 016524                                ERRDF   211.,EM45,ERR2      ;MP MODIFIED BA
506 016524 104462                                TRAP   T$ERCODE
507 016526 000323                                .WORD  211
508 016530 006154                                .WORD  EM45
509 016532 010126                                .WORD  ERR2
510
511 016534 104006 2$:   CKLOOP                                ;CHECK IF /FL:LOE IS SET
512 016534                                EMT    C$CLP1
513 016536 022777 177777 163374          CMP      #-1,@RLDA      ;DISK ADDRESS OKAY
514 016544 001412                                BEQ      3$              ;YES, CONTINUE
515
516 016546 017737 163366 002242          MOV      @RLDA,BDDAT      ;SET UP BAD
517 016554 012737 177777 002240          MOV      #-1,GDDAT      ;SET UP EXPECTED
518
519 016562                                ERRDF   212.,EM46,ERR2      ;MP MODIFIED DA
520 016562 104462                                TRAP   T$ERCCDE
521 016564 000324                                .WORD  212

```

```

016566 006207          .WORD  EM46
016570 010126          .WORD  ERR2
508
509 016572          3$:
510
511
512 016572          ENDTST          ;****END OF TEST****
    016572          L10042:
    016572 104001          EMT      C$ETST
513
514          .SBTTL  **TEST 21** - NOOP FUNCTION(RL11 ONLY)
515
516 016574          BGNST          ;****START OF TEST****
517
518
519
520 016574          STARS
                    :*****
521          :TEST THAT NOOP WILL FUNCTION. WE WILL ISSUE THE
522          :NOOP AND WAIT FOR CONTROLLER READY TO SET. A
523          :TIMEOUT OF 200 MILLISECS IS ALLOWED. DRIVE 0 IS ALWAYS
524          :SELECTED SINCE THE DRIVE IS NOT NECESSARY.
525 016574          STARS
                    :*****
526
527
528 016574 005737 002266          TST      T.CNTRL          ;RLV11??
529 016600 001410          BEQ      99$          ;YES SKIP TEST
530
531
532 016602 004537 013102          JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
533 016606 000000          NOOP0          ;NOOP(0) FUNCTION
534 016610 004537 013712          JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
535 016614          2$:          CKLOOP          ;CHECK IF /FL:LOE IS SET
    016614 104006          EMT      C$CLP1
536
537 016616 004537 012602          JSR      R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
538
539 016622          99$:
540 016622          ENDTST          ;****END OF TEST****
    016622          L10043:
    016622 104001          EMT      C$ETST
541
542
543          .SBTTL  **TEST 22** - TEST NOOP DOES NOTHING
544
545 016624          BGNST          ;****START OF TEST****
546
547 016624          STARS
                    :*****
548          :TEST THAT ISSUING A NOOP FUNCTION DOES NOTHING. THIS IS DONE BY WRITING
549          :THE RLBA, AND RLDA, READING THE RLMP AND MAKING SURE NOTHING CHANGES.
550 016624          STARS
                    :*****
551
552 016624 005737 002266          TST      T.CNTRL          ;RLV11??
553 016630 001476          BEQ      3$

```

```

554
555 016632 012777 000001 163300      MOV      #1,@RLDA      ;LOAD DISK ADDRESS
556 016640 012777 000002 163270      MOV      #2,@RLBA      ;LOAD BUS ADDRESS
557 016646 005077 163270                CLR      @RLMP
558 016652 017737 163264 002240      MOV      @RLMP,GDDAT    ;READ RLMP
559
560 016660 004537 013102                JSR      R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
561 016664 000000                NOOP0
562 016666 004537 013712                JSR      R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
563 016672                CKLOOP
    016672 104006                EMT      C$CLP1        ;CHECK IF /FL:LOE IS SET
564
565 016674 004537 012602                JSR      R5,CHERR       ;CHECK CONTROLLER FOR ERRORS
566 016700                ESCAPE  TST              ;IF /FL:LOE SET LOOP, ELSE EXIT TST
    016700 104010                EMT      C$ESCAPE
    016702 000124                .WORD   L10044-
567
568 016704 017737 163232 002242      MOV      @RLMP,BDDAT    ;READ RLMP
569 016712 023737 002240 002242      CMP      GDDAT,BDDAT    ;RLMP OK?
570 016720 001404                BEQ
571
572 016722                ERRDF  202.,EM14,ERR2
    016722 104462                TRAP   T$ERCODE
    016724 000312                .WORD  202
    016726 005221                .WORD  EM14
    016730 010126                .WORD  ERR2
573
574 016732                1$:  CKLOOP
    016732 104006                EMT      C$CLP1        ;CHECK IF /FL:LOE IS SET
575
576 016734 012737 000002 002240      MOV      #2,GDDAT       ;SET UP EXP'D BA
577 016742 017737 163170 002242      MOV      @RLBA,BDDAT    ;READ BA
578 016750 023737 002240 002242      CMP      GDDAT,BDDAT    ;BA OK?
579 016756 001404                BEQ      2$            ;YES
580
581 016760                ERRDF  203.,EM15,ERR2
    016760 104462                TRAP   T$ERCODE
    016762 000313                .WORD  203
    016764 005247                .WORD  EM15
    016766 010126                .WORD  ERR2
582
583 016770                2$:  CKLOOP
    016770 104006                EMT      C$CLP1        ;CHECK IF /FL:LOE IS SET
584
585 016772 012737 000001 002240      MOV      #1,GDDAT       ;SET UP EXP'D DA
586 017000 017737 163134 002242      MOV      @RLDA,BDDAT    ;READ DA
587 017006 023737 002240 002242      CMP      GDDAT,BDDAT    ;DA OKAY
588 017014 001404                BEQ      3$
589
590 017016                ERRDF  204.,EM16,ERR2
    017016 104462                TRAP   T$ERCODE
    017020 000314                .WORD  204
    017022 005275                .WORD  EM16
    017024 010126                .WORD  ERR2
591
592 017026                3$:
593
  
```

594 017026 ENDTST ;****END OF TEST****
 017026 L10044:
 017026 104001 EMT C\$ETST

595
596
597 .SBTTL **TEST 23** - TEST OF INTERRUPT

599 017030 BGNTST ;****START OF TEST****

600
601 017030 STARS
 :*****
602 :CHECK THE INTERRUPT WITH A NOOP. WE WILL SET UP THE
603 :INTERRUPT VECTOR, LOWER THE PSW TO ZERO AND ISSUE
604 :A NOOP. THE INTERRUPT SERVICE ROUTINE WILL SET A
605 :FLAG UPON INTERRUPT AND RETURN IN LINE. WE WAIT 200 MILLISECONDS
606 :LOOKING FOR THAT FLAG TO BE SET BEFORE CALLING IT
607 :AN ERROR. IF THE INTERRUPT SENDS US TO ANOTHER
608 :VECTOR ADDRESS THEN THE ERROR HANDLER WILL REPORT
609 : "TRAP TO XXXX FROM YYYY" AND RETURN TO DIAG SUP MONITOR. IF THE
610 :INTERRUPT GOES TO ABOVE 1000 WHO KNOWS WHAT WILL HAPPEN.
611 017030 STARS

 :*****
612
613
614 017030 005737 002266 TST T.CNTRL
615 017034 001426 BEQ 99\$
616
617 017036 005037 002206 CLR INTFLG ;CLEAR INTERRUPT OCCRUANCE FLAG
618 017042 SETPRI #PRI00 ;SET PSW TO 0
 017042 012700 000000 MOV #PRI00,R0
 017046 104041 EMT C\$SPRI
619 017050 004537 013102 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
620 017054 000100 NOOP0!INTEN ;NOOP AND INTERRUPT ENABLE
621 017056 004537 013712 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
622 017062 005737 002206 TST INTFLG ;DID INTERRUPT OCCUR
623 017066 001004 BNE 2\$;IF SO BRANCH
624 017070 ERRDF 22.,EM13,ERRO
 017070 104462 TRAP T\$ERCODE
 017072 000026 .WORD 22
 017074 005167 .WORD EM13
 017076 010076 .WORD ERRO
625 017100 005037 002206 2\$: CLR INTFLG
626 017104 CKLOOP ;CHECK IF /FL:LOE IS SET
 017104 104006 EMT C\$CLP1
627 017106 004537 012602 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS

628
629
630 017112 99\$:
631 017112 ENDTST ;****END OF TEST****
 017112 L10045:
 017112 104001 EMT C\$ETST

632
633 .SBTTL **TEST 24** - TEST PRIORITY BR LEVEL

636 017114 BGNTST ;****START OF TEST****

637

```
638 017114          STARS
639                ;*****
640                ;TEST THAT PRIORITY GIVEN IS ACTUAL PRIORITY OF CONTROLLER. WE KNOW
641                ;THE BOARD WILL INTERRUPT. WE WILL START TRYING TO INTERRUPT AT 7
642 017114          ;AND WOPK DOWN TIL IT DOES INTERRUPT.
643                STARS
644                ;*****
644 017114 005737 002266          TST      T.CNTRL      ;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****
651 017136 104004          EMT      C$BSEG
652 017140 005037 002206  5$:    CLR      INTFLG      ;CLEAR INTERRUPT OCCURANCE
653 017144          SETPRI     BDDAT      ;SET PRIORITY
654 017144 013700 002242  MOV      BDDAT,RO
655 017150 104041          EMT      C$SPRI
656 017152 004537 013102  JSR      R5,LDFUNC   ;ISSUE FUNCTION OF FOLLOWING WORD
657 017156 000100          NOOPO!INTEN
658 017160 004537 013712  JSR      R5,WTCRDY   ;WAIT FOR CONTROLLER READY HIGH
659 017164          ESCAPE     TST          ;IF /FL:LOE SET LOOP, ELSE EXIT TST
660 017164 104010          EMT      C$ESCAPE
661 017166 000070          .WORD   L10046-.
662 017170 004537 012602  JSR      R5,CHERR    ;CHECK CONTROLLER FOR ERRORS
663 017174          ESCAPE     TST          ;IF /FL:LOE SET LOOP, ELSE EXIT TST
664 017174 104010          EMT      C$ESCAPE
665 017176 000060          .WORD   L10046-.
666 017200 023737 002242 002240  CMP      BDDAT,GDDAT ;SHOULD IT INTERRUPT
667 017206 002012          BGE      1$          ;NO, BRANCH
668 017210 005737 002206  TST      INTFLG      ;DID INTERRUPT OCCUR
669 017214 001004          BNE      2$          ;YES, OK
670 017216          3$:    ERRDF   204.,EM17,ERR7
671 017216 104462          TRAP    T$ERCODE
672 017220 000314          .WORD   204
673 017222 005323          .WORD   EM17
674 017224 010364          .WORD   ERR7
675 017226          2$:    ESCAPE   SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
676 017226 104010          EMT      C$ESCAPE
677 017230 000014          .WORD   10000$-.
678 017232 000405          BR      4$
679 017234 005737 002206  1$:    TST      INTFLG      ;DID INTERRUPT OCCUR
680 017240 001772          BEQ      2$          ;NO, OK
681 017242 000765          BR      3$          ;YES, ERROR
682 017244          ENDSEG          ;****END OF SEGMENT****
683 017244          10000$:
```

```

679 017244 104005      EMT      C$ESEG
680 017246 162737 000040 002242 4$:  SUB      #40,BDDAT      ;NEXT LEVEL
681 017254 100331      BPL      5$
682 017256      6$:
683 017256      ENDTST
017256      L10046:      ;****END OF TEST****
017256 104001      EMT      C$ETST
684
685      .SBTTL  **TEST 25** - GET STATUS FUNCTION
686
687 017260      BGNST      ;****START OF TEST****
688
689
690 017260      STARS
691      ;*****
692      ;TEST GET STATUS FUNCTION. THE GET STATUS FUNCTION WILL
693      ;WORK IF DRIVE IS LOADED AND READY OR NOT. THE RLDA
694      ;IS LOADED WITH THE GET STATUS AND MARKER BITS (BITS 1,0)
695      ;AND THE FUNCTION IS ISSUED. WE WAIT 200 MILLISECONDS
696 017260      ;FOR CONTROLLER READY. VERIFY THAT NO ERRORS OCCUR.
697      STARS
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
017306      L10047:      ;****END OF TEST****
017306 104001      EMT      C$ETST
708
709
710      .SBTTL  **TEST 26** - GET STATUS FUNCTION INTERRUPT
711
712 017310      BGNST      ;****START OF TEST****
713
714      ;CHECK GET STATUS UNDER INTERRUPT
715
716 017310 005037 002206      CLR      INTFLG      ;CLEAR INTERRUPT OCCURANCE
717 017314      SETPRI #PRI00      ;PSW TO LEVEL 0
017314 012700 000000      MOV      #PRI00,R0
017320 104041      EMT      C$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$CLP1
727 017370 004537 012602  JSR     R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
728 017374 005037 002206  CLR     INTFLG        ;CLEAR INTERRUPT OCCURANCE
729 017400          SETPRI  #PRI00        ;PSW TO LEVEL 0
      017400 012700 000000  MOV     #PRI00,RO
      017404 104041      EMT     C$SPRI
730 017406 012777 000003 162524  MOV     #GSBIT!MK,@RLDA ;SET UP DA FOR GET STATUS 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,RO
      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$CLP1
739 017454 004537 012602  JSR     R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
740 017460          ENDTST
      017460          L10050:
      017460 104001      EMT     C$ETST

741
742
743          .SBTTL  **TEST 27** - GET STATUS FUNCTION GENERATES OPI W/O GS BIT
744
745 017462          BGNST          ;****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
  
```

```

763 017520 004537 012602          JSR    R5,CHERR
764 017524          1$:    CKLOOP
    017524 104006          EMT    C$CLP1
765 017526 032737 002000  Q02166  BIT    #OPI,E.CS      ;IS OPI SET?
766 017534 001004          BNE    2$            ;YES-BRANCH NO-CHECK TIMEOUT
767 017536          ERRDF  29.,EM33,ERRO
    017536 104462          TRAP  T$ERCODE
    017540 000035          .WORD 29
    017542 005511          .WORD EM33
    017544 010076          .WORD ERRO
768 017546          2$:
769
770 017546          ENDTST          ;****END OF TEST****
    017546          L10051:
    017546 104001          EMT    C$ETST
771
772
773          .SBTTL  **TEST 28** - OPI UNDER INTERRUPT
774
775 017550          BGNTST          ;****START OF TEST****
776 017550          STARS
    ;*****
777          ;FORCE AN OPI ERROR UNDER INTERRUPT TO VERIFY THAT
778          ;AN INTERRUPT WILL OCCUR FROM OPI.  THE OPI IS FORCED
779          ;USING A GET STATUS WITHOUT THE GET STATUS BIT SET
780          ;IN RLDA.
781 017550          STARS
    ;*****
782
783
784 017550          SETPRI  #PRI00
    017550 012700 000000  MOV    #PRI00,RO
    017554 104041          EMT    C$SPRI
785 017556 005037 002206  CLR    INTFLG
786 017562 012777 000001 162350  MOV    #MK,@RLDA      ;SET ONLY MARKER BIT!!
787 017570 004537 013102  JSR    R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
788 017574 000104          GSTAT!INTEN          ;GET STATUS
789 017576 004537 013712  JSR    R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
790 017602          SETPRI  #PRI07
    017602 012700 000340  MOV    #PRI07,RO
    017606 104041          EMT    C$SPRI
791 017610 005737 002206  TST   INTFLG          ;INTERRUPT OCCUR
792 017614 001004          BNE    2$
793
794 017616          ERRDF  30.,EM11,ERRO
    017616 104462          TRAP  T$ERCODE
    017620 000036          .WORD 30
    017622 005126          .WORD EM11
    017624 010076          .WORD ERRO
795
796 017626          2$:    CKLOOP
    017626 104006          EMT    C$CLP1          ;CHECK IF /FL:LOE IS SET
797
798 017630 032737 074000 002166  BIT    #74000,E.CS
799 017636 001405          BEQ   1$
800 017640 012737 003770 013064  MOV    #OPIERR,RESTMS
801 017646 004537 012602          JSR    R5,CHERR
  
```

```

802 017652          1S:   CKLOOP
      017652 104006      EMT   C$CLP1
803 017654 032737 002000 002166  BIT   #OPI,E.CS      ;IS OPI SET?
804 017662 001004      BNE   3$          ;YES-BRANCH NO-CHECK TIMEOUT
805 017664          ERRDF 31.,EM33,ERRO
      017664 104462      TRAP  T$ERCODE
      017666 000037      .WORD 3;
      017670 005511      .WORD EM33
      017672 010076      .WORD ERRO
806 017674          3$:
807
808
809 017674          ENDTST          ;****END OF TEST****
      017674          L10052:
      017674 104001      EMT   C$ETST
810
811          .SBTTL **TEST 29** - READ HEADER FUNCTION
812
813 017676          BGN1ST          ;****START OF TEST****
814 017676          STARS
      ;*****
815          ;CHECK THAT READ HEADER WORKS, THAT WE CAN ISSUE
816          ;IT, GET READY BACK WITHOUT ANY ERRORS SETTING.
817 017676          STARS
      ;*****
818
819
820
821 017676 004537 013102      JSR   R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
822 017702 000010          RDHDR          ;READ HEADER
823 017704 004537 013712      JSR   R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
824          ;READY
825 017710          2$:   CKLOOP          ;CHECK IF /FL:LOE IS SET
      017710 104006      EMT   C$CLP1
826
827 017712 004537 012602      JSR   R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
828
829 017716          ENDTST          ;****END OF TEST****
      017716          L10053:
      017716 104001      EMT   C$ETST
830
  
```

1

```

1          .SBTTL **TEST 30** - READ HEADER FUNCTION INTERRUPT
2
3 017720   BGNTST                               ;****START OF TEST****
4
5 017720   STARS
6          ;*****
7          ;CHECK THAT READ HEADER WILL GENERATE AN INTERRUPT
8 017720   ;UPON COMPLETION WITHOUT ANY ERRORS SETTING
9          STARS
10         ;*****
11 017720   SETPRI #PRI00                       ;PSW TO 0
12 017720   MOV    #PRI00,RO
13 017724   EMT    C$SPRI
14 017726   CLR    INTFLG                       ;CLEAR INTERRUPT OCCURANCE
15 017732   JSR    R5,LDFUNC                    ;ISSUE FUNCTION OF FOLLOWING WORD
16 017736   RDHDR!INTEN                        ;READ HEADER, INTR. ENA
17 017740   JSR    R5,WTCRDY                    ;WAIT FOR CONTROLLER READY HIGH
18 017744   SETPRI #PRI07
19 017744   MOV    #PRI07,RO
20 017750   EMT    C$SPRI
21 017752   TST    INTFLG                       ;INTERRUPT HAPPEN
22 017756   BNE    2$                          ;YES-CONTINUE
23 017760   ERDF   35.,EM37,ERRO
24 017760   TRAP  T$ERCODE
25 017762   .WORD  35
26 017764   .WORD  EM37
27 017766   .WORD  ERRO
28 017770   2$: CKLOOP                          ;CHECK IF /FL:LOE IS SET
29 017770   EMT    C$CIP1
  
```

```

1
2 017772 004537 012602          JSR    R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
3
4 017776          ENDTST          ;****END OF TEST****
  017776          L10054:
  017776 104001          EMT    C$ETST
5
6
7          .SBTTL  **TEST 31** - REPEATED RD HDRS YIELD SAME CYL AND HD
8
9 020000          BGNST          ;****START OF TEST****
10
11
12 020000          STARS
   ;*****
13          ;CHECKT THAT READ HEADERS WILL RELIABLY READ THE SAME
14          ;CYLINDER AND HEAD SELECT.  WE WILL READ HEADERS VERIFYING
15          ;THAT WE ALWAYS READ THE SAME CYLINDER AND HEAD SELECT.
16 020000          STARS
   ;*****
17
18
19 020000 012701 000144          MOV    #100.,R1          ;SET UP TO DO 100 RD HDR'S
20 020004 004537 013102          JSR    R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
21 020010 000010          RDHDR          ;READ HEADER
22 020012 004537 013712          JSR    R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
23 020016          99$: ESCAPE TST          ;IF /FL:LOE SET LOOP, ELSE EXIT TST
   020016 104010          EMT    C$ESCAPE
   020020 000122          .WORD  L10055-.
24
25 020022 004537 012602          JSR    R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
26 020026          ESCAPE TST          ;IF /FL:LOE SET LOOP, ELSE EXIT TST
   020026 104010          EMT    C$ESCAPE
   020030 000112          .WORD  L10055-.
27
28 020032 013737 002174 002240          MOV    E.MP,GDDAT          ;READ FIRST HEADER (ASSUME GOOD)
29 020040 043737 002212 002240          BIC    SECMSK,GDDAT          ;MASK AWAY SECTOR BITS
30 020046          BGNSEG          ;****START OF SEGMENT****
   020046 104004          EMT    C$BSEG
31 020050          2$:
32 020050 004537 013102          JSR    R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
33 020054 000010          RDHDR
34 020056 004537 013712          JSR    R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
35 020062          97$: ESCAPE SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
   020062 104010          EMT    C$ESCAPE
   020064 000054          .WORD  10000$-.
36
37 020066 004537 012602          JSR    R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
38 020072          ESCAPE SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
   020072 104010          EMT    C$ESCAPE
   020074 000044          .WORD  10000$-.
39
40 020076 013737 002174 002242          MOV    E.MP,BDDAT          ;READ HEADER
41 020104 043737 002212 002242          BIC    SECMSK,BDDAT          ;MASK AWAY SECTOR BITS
42 020112 023737 002240 002242          CMP    GDDAT,BDDAT          ;IS HEADER CORRECT
43 020120 001404          BEQ    4$
44

```

```

45 020122          ERRDF 36.,EM41,ERR4
   020122 104462   TRAP  T$ERCODE
   020124 000044   .WORD 36
   020126 005673   .WORD EM41
   020130 010242   .WORD ERR4

46
47 020132          4$: CKLOOP          ;CONSTANT CYL & HS
   020132 104006   EMT  C$CLP1          ;CHECK IF /FL:LOE IS SET

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$:
52 020142          EMT  C$ESEG
   020142 104005   END!ST          ;****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 !ST
   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 !ST
   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
  
```

```

87 020252 013737 002200 002242      MOV      E.MP2,BDDAT      ;THIRD READ OF DB GETS CRC
88 020260 023737 002240 002242      CMP      GDDAT,BDDAT     ;IS CRC CORRECT?
89 020266 001404                      BEQ      6$              ;IF SO CONTINUE
90
91 020270                      ERRDF   37.,EM42.,ERR4
   020270 104462                      TRAP   T$ERCODE
   020272 000045                      .WORD 37
   020274 005764                      .WORD EM42
   020276 010242                      .WORD ERR4
92 020300                      6$:
93
94 020300                      ENDTST                      ;****END OF TEST****
   020300 L10056:
   020300 104001                      EMT      C$ETST
95
96
97                      .SBTTL **TEST 33** - CHECK CONSECUTIVE HEADERS
98
99 020302                      BGNSTST                      ;****START OF TEST****
100
101
102 020302                      STARS
   ;:*****
   ;:CHECK THAT THE HEADERS ARE CONSECUTIVE. WE WILL DO
   ;:40 (FORTY) READ HEADERS AND STORE EACH. AFTER WE HAVE
   ;:READ THE FORTIETH HEADER WE WILL VERIFY THAT
   ;:THEY CAME IN SEQUENTIAL, THAT 0 FOLLOWS 39,
   ;:THAT THERE WERE NO ERRORS.
   ;:
   ;:*****
103
104
105
106
107
108 020302                      STARS
   ;:*****
109
110
111 020302 005037 002244      CLR      FIRST           ;CLEAR FIRST READ DONE FLAG
112 020306 012703 003150      MOV      #HDRBUF,R3     ;STORE HEADERS
113 020312 012701 000050      MOV      #40.,R1        ;FORTY HEADERS
114 020316 012737 000210 002154      MOV      #RDHDR!CRDY,B.CS
115 020324 053737 002152 002154      BIS      DRIVE,B.CS
116 020332 013777 002154 161574      MOV      B.CS,@RLCS
117 020340 042777 000200 161566 2$:
118 020346 032777 000200 161560 1$:
   BIT      #200,@RLCS
   BIT      #200,@RLCS      ;DONE?
119 020354 001774                      BEQ      1$
120 020356 017723 161552      MOV      @RLCS,(R3)+
121 020362 017723 161554      MOV      @RLMP,(R3)+
122 020366 017723 161550      MOV      @RLMP,(R3)+
123 020372 017723 161544      MOV      @RLMP,(R3)+
124 020376 005301                      DEC      R1
125 020400 001357                      BNE      2$              ;HAVE WE READ FORTY HEADERS
126 020402 012703 003150      MOV      #HDRBUF,R3     ;GO BACK UNTIL FORTY DONE
127 020406 012701 000050      MOV      #40.,R1        ;GET LIST OF HEADERS
128 020412 011337 002166      MOV      (R3),E.CS      ;CHECK FORTY OF THEM
129 020416 005737 002166      TST     E.CS
130 020422 100016                      BPL     99$
131 020424 012737 004227 013064      MOV      #RHDMES,RESTMS
132 020432 005723                      TST     (R3)+
133 020434 012337 002174      MOV      (R3)+,E.MP
134 020440 012337 002176      MOV      (R3)+,E.MP1
135 020444 012337 002200      MOV      (R3)+,E.MP2

```

```

136 020450 004537 012602 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
137 020454 000137 020616 JMP 7$
138 020460 005723 99$: TST (R3)+
139 020462 011337 002242 MOV (R3),BDDAT ;GET HEADER
140 020466 005737 002244 TST FIRST ;IS THIS FIRST READ?
141 020472 001007 BNE 4$ ;NO, BRANCH
142 020474 012737 000001 002244 MOV #1,FIRST ;SET FIRST READ DONE FLAG
143 020502 013737 002242 002240 3$: MOV BDDAT,GDDAT ;SET UP NEXT READ EXPECTED
144 020510 000435 BR 6$ ;GO SEE IF TEST IS DONE
145 020512 005237 002240 4$: INC GDDAT ;INCREMENT EXP'D HEADER
146 020516 023737 002242 002240 CMP BDDAT,GDDAT ;IS NEW HEADER SEQUENTIAL?
147 020524 001766 BEQ 3$ ;YES THEN BRANCH
148 020526 033737 002212 002242 BIT SECMSK,BDDAT ;IS NEW HEADER ZERO?
149 020534 001015 BNE 5$ ;NO, THEN ERROR GO REPORT IT
150 020536 013737 002240 002224 MOV GDDAT,TEMP2 ;YES, CHECK IF LAST HEADER WAS
151 020544 043737 002246 002224 BIC CYLSK,TEMP2 ;MAX ADDRESS, IF SO BRANCH
152 020552 023737 002250 002224 CMP MXSEC1,TEMP2 ;STORE NEW DATA AS OLD
153 020560 001750 BEQ 3$ ;AND PERFORM NEW RD HDR
154 020562 043737 002212 002240 BIC SECMSK,GDDAT ;EXPECTING ZERO SECTOR
155
156 020570 5$:
157
158 020570 005037 002244 CLR FIRST ;ERROR WILL MAKE US MISS
159 ;NEXT SECTOR SEQUENTIALLY
160 ;START OVER; CLEAR FIRST FLAG
161 020574 ERRDF 38,EM43,ERR2
    020574 104462 TRAP T$ERCODE
    020576 000046 .WORD 38
    020600 006022 .WORD EM43
    020602 010126 .WORD ERR2
162 020604 6$: CKLOOP ;CHECK IF /FL:LOE IS SET
    020604 104006 EMT C$CLP1
163
164 020606 062703 000006 ADD #6,R3
165 020612 005301 DEC R1 ;HAVE WE DONE THIS ENOUGH
166 020614 001321 BNE 99$ ;NO, GO BACK DO IT AGAIN
167 020616 7$:
168 020616 ENDTST ;****END OF TEST****
    020616 L10057:
    020616 104001 EMT C$ETST
169
170
171 .SBTTL **TEST 34** - SEEK FUNCTION
172
173 020620 BGNST ;****START OF TEST****
174 020620 STARS
    ;:*****
175 ;CHECK THE SEEK FUNCTION RETURNS CONTROLLER READY
176 ;WITH NO ERRORS. WE ISSUE A ONE TRACK IN WORD SFEK.
177 ;WE DO NOT CHECK THE RESULT FOR POSITION
178 020620 STARS
    ;:*****
179
180
181 020620 012777 000205 161312 MOV #BIT7,MK$SIGN,@R1DA ;SET UP DA-DIFF=1,MARKER,TOWARDS
182 020626 004537 013102 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
183 020632 000006 SEEK ;SEEK
  
```

```
184 020634 004537 013712      JSR      R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
185 020640                      WAITMS   #2.
    020640 012700 000602      MOV      #2.,R0
    020644 104026              EMT      C$WTM
186 020646                      2$:      CKLOOP
    020646 104006              EMT      C$CLP1      ;CHECK IF /FL:LOE IS SET
187
188
189 020650 004537 012602      JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
190
191 020654                      ENDTST
    020654                      L10060:
    020654 104001              EMT      C$ETST      ;****END OF TEST****
192
193
194                      .SBTTL  **TEST 35** - CHECK DRIVE READY ON SEEK
195
196 020656                      BGNST
197
198
199 020656                      STARS
200                      ;:*****
201                      ;CHECK THE SEEK FUNCTION RETURNS DRIVE READY WITH
202                      ;NO ERRORS. WE ISSUE A ONE TRACK INWARD SEEK. WE DO
203 020656                      ;NOT CHECK THE RESULT FOR POSITION
204                      ;:*****
205
206
207 020656 012777 000201 161254  MOV      #BIT7.MK,@RLDA ;SET DA, MARKER, DIFF=1.
208 020664 004537 013102      JSR      R5,LDFUNC     ;ISSUE FUNCTION OF FOLLOWING WORD
209 020670 000006              SEEK
210 020672 004537 013712      JSR      R5,WTCRDY     ;WAIT FOR CONTROLLER READY HIGH
211 020676                      CKLOOP
    020676 104006              EMT      C$CLP1      ;CHECK IF /FL:LOE IS SET
212
213 020700 004537 012602      JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
214 020704                      CKLOOP
    020704 104006              EMT      C$CLP1      ;CHECK IF /FL:LOE IS SET
215
216 020706 004537 013646      JSR      R5,WTCRDY     ;WAIT FOR DRIVE READY
217 020712                      CKLOOP
    020712 104006              EMT      C$CLP1      ;CHECK IF /FL:LOE IS SET
218
219 020714 004537 012602      JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
220
221 020720                      ENDTST
    020720                      L10061:
    020720 104001              EMT      C$ETST      ;****END OF TEST****
222
223
224                      .SBTTL  **TEST 36** - SEEK FUNCTION INTERRUPT
225
226 020722                      BGNST
227
228
```

```

229 020722          STARS
230                :*****
231                :CHECK THAT CONTROLLER READY RESETTING WHEN THE SEEK IS
232                :INITIATED CAUSES AN INTERRUPT BUT DRIVE READY WILL
233 020722          STARS
234                :*****
235
236
237
238 020722 005037 002206      CLR      INTFLG
239 020726          SETPRI   #PRI00          ;SET PSW TO 0
240 020726 012700 000000      MOV      #PRI00,R0
241 020732 104041          EMT      C$SPRI
242 020734 012777 000205 161176  MOV     #BIT7!MK!SIGN,@RLDA ;SET UP RLDA
243 020742 004537 013102      JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
244 020746 000106          SEEK!INTEN      ;SEEK AND INTR. ENA.
245 020750 004537 013712      JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
246 020754 000240          NOP
247 020756 005737 002206 1$:  TST      INTFLG          ;DID INTERRUPT OCCUR
248 020762 001004          BNE      2$
249 020764          ERRDF   40.,EM47,ERPO
250 020766 104462          TRAP   T$ERCODE
251 020770 000050          .WORD  40
252 020772 006242          .WORD  EM47
253 020774 010076          .WORD  ERRO
254 020774 104006 2$:      CKLOOP
255 020776          EMT      C$CLP1          ;CHECK IF /FL:LOE IS SET
256
257
258 020776 004537 012602      JSR      R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
259 021002          CKLOOP
260 021002 104006          EMT      C$CLP1          ;CHECK IF /FL:LOE IS SET
261
262
263 021004 005037 002206      CLR      INTFLG          ;CLEAR INTERRUPT OCCURANCE
264
265
266 021010 004537 013646 5$:  JSR      R5,WTDROY          ;WAIT FOR DRIVE READY
267 021014          CKLOOP
268 021014 104006          EMT      C$CLP1          ;CHECK IF /FL:LOE IS SET
269
270
271 021016          SETPRI   #PRI07
272 021016 012700 000340      MOV      #PRI07,R0
273 021022 104041          EMT      C$SPRI
274 021024 005737 002206      TST      INTFLG          ;DID DRIVE READY CAUSE INTERRUPT
275 021030 001404          BEQ      6$
276
277
278 021032          ERRDF   42.,EM52,ERRO
279 021032 104462          TRAP   T$ERCODE
280 021034 000052          .WORD  42
281 021036 006273          .WORD  EM52
282 021040 010076          .WORD  ERRO
283 021042          CKLOOP
284 021042 104006 6$:      EMT      C$CLP1          ;CHECK IF /FL:LOE IS SET
285
286
287 021044          ENDTST          ;****END OF TEST****
  
```

```

021044          L10062:
021044 104001          EMT      C$ETST

268
269
270
271
272 021046          BGNIST          ;****START OF TEST****
273
274
275
276
277 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.
                STARS
                ;:*****

278
279
280
281
282
283
284
285
286 021046          BGNSEG      MOV      #SKLST,R3          ;GET LIST OF DIFFERENCE WORDS
                ;:*****START OF SEGMENT****
                EMT      C$BSEG

287
288
289 021046 012703 002502          1$:
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                RDHDR          ;READ HEADER
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
290 021052          98$:
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

291 021054          ;
                JSR      R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

292 021054 004537 013102          ;
                MOV      E.MP,BDDAT          ;READ HEADER
                BIC      SECMSK,BDDAT          ;CLEAR OUT SECTOR
293 021060 000010          BEQ      99$          ;IF ON TRACK ZERO, H.S. ZERO, OK
294 021062 004537 013712          ;
                ;NOT ON TRACK ZERO CALCULATE DIFFERENCE WORD AND PUT IT BACK
                ;ON ZERO.

295 021066          BIC      #RHHS,BDDAT          ;CLEAR OUT HEAD SELECT
                EMT      C$CLP1          ;PUT CYLINDER AS DIFFERENCE WORD
                MOV      BDDAT,@RLDA          ;SET MARKER BIT
                BIS      #MK,@RLDA          ;ISSUE FUNCTION OF FOLLOWING WORD
                JSR      R5,LDFUNC          ;SEEK
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

296
297 021070 004537 012602          ;
                JSR      R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

298 021074          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

299
300 021076 013737 002174 002242          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

301 021104 043737 002212 002242          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

302 021112 001462          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

303
304
305
306
307 021114 042737 000100 002242          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

308 021122 013777 002242 161010          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

309 021130 052777 000001 161010          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

310 021136 004537 013102          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

311 021142 000006          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

312 021144 004537 013712          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

313 021150          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

314
315 021152 004537 012602          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

316 021156          ;
                MOV      BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
                BIS      #MK,@RLDA          ;SET MARKER BIT
                JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
                SEEK          ;SEEK
                JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
                CKLOOP          ;CHECK IF /FL:LOE IS SET
                EMT      C$CLP1

```

317	021156	104006			EMT	C\$CLP1	
318	021160	004537	013646		JSR	R5,WTRDY	: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,WTRDY	: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			.WORD	ERR3	
339	021256			5\$:	CKLOOP		:CHECK IF /FL:LOE IS SET
	021256	104006			EMT	C\$CLP1	
340							
341	021260	011377	160654		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,WTRDY	:WAIT FOR CONTROLLER READY HIGH
346	021304				CKLOOP		:CHECK 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,WTRDY	: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							

```

360 021336 004537 013712      JSR    R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
361 021342                    CKLOOP              ;CHECK IF /FL:LOE IS SET
    021342 104006          EMT    C$CLP1
362                                ;
363 021344 004537 012602      JSR    R5,CHERR       ;CHECK CONTROLLER FOR ERRORS
364 021350                    ESCAPE    SEG              ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
    021350 104010          EMT    C$ESCAPE
    021352 000106          .WORD   10000$-
365                                ;
366 021354 011337 002240      MOV    (R3),GDDAT     ;GET EXPECTED CYLINDER
367 021360 011337 002254      MOV    (R3),DWORD     ;SET UP DIFFERENCE FOR SEEK
368 021364 013737 002174 002242 8$:  MOV    E.MP,BDDAT     ;READ HEADER FROM RLMP
369 021372 043737 002212 002242  BIC    SECMSK,BDDAT  ;CLEAR OUT SECTOR BITS
370 021400 023737 002240 002242  CMP    GDDAT,BDDAT   ;DID SEEK GO TO THE RIGHT
371 021406 001404                    BEQ    9$              ;TRACK, IF SO, GO GET NEXT
372                                ;
373 021410                    ERRDF   44.,EM54,ERR3
    021410 104462          TRAP    T$ERCODE
    021412 000054          .WORD   44
    021414 006343          .WORD   EM54
    021416 010170          .WORD   ERR3
374 021420                    9$:  CKLOOP
    021420 104006          EMT    C$CLP1      ;CHECK IF /FL:LOE IS SET
375                                ;
376 021422 005723                    TST    (R3)+          ;BUMP PATTERN
377 021424 023727 002264 000001  CMP    T.DRIVE,#1
378 021432 001005                    BNE    2$
379 021434 020327 002602      CMP    R3,#SKFND
380 021440 001407                    BEQ    10$
381 021442 000137 021054      JMP    1$
382                                ;
383 021446 020327 002644      2$:  CMP    R3,#SKEEND
384 021452 001402                    BEQ    10$
385 021454 000137 021054      JMP    1$
386                                ;
387 021460                    10$:
388                                ;
389 021460                    ENDSEG
    021460 10000$:
    021460 104005          EMT    C$ESEG      ;****END OF SEGMENT****
390 021462                    ENDTST
    021462 L10063:
    021462 104001          EMT    C$ETST      ;****END OF TEST****
391                                ;
392                                ;
393                                ;
394                                ;
395 021464                    BGNTST      ;****START OF TEST****
396                                ;
397                                ;
398                                ;
399 021464                    STARS
    ;:*****
400                                ;CHECK THAT WE CAN SELECT HEAD SELECT ZERO. ISSUE
401                                ;SEEK TO HEAD SELECT 0 AND VERIFY WITH READ HEADER.
402 021464                    STARS
    ;:*****
  
```

```

403
404 021464 012777 000001 160446 99$: MOV #MK,@RLDA ;SET MARKER IN RLDA
405 021472 005037 002240 CLR GDDAT ;SET EXPECTED
406 ;LOAD HS=0 INTO RLDA
407 021476 2$: JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
408 021476 004537 013102 SEEK ;SEEK
409 021502 000006 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
410 021504 004537 013712 CKLOOP ;CHECK IF /FL:LOE IS SET
411 021510 EMT C$CLP1
412 021510 104006
413 021512 004537 012602 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
414 021516 CKLOOP ;CHECK IF /FL:LOE IS SET
415 021516 104006 EMT C$CLP1
416 021520 004537 013646 JSR R5,WTD RDY ;WAIT FOR DRIVE READY
417 021524 89$: CKLOOP ;CHECK IF /FL:LOE IS SET
418 021524 104006 EMT C$CLP1
419 021526 004537 012602 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
420 021532 CKLOOP ;CHECK IF /FL:LOE IS SET
421 021532 104006 EMT C$CLP1
422 021534 004537 013102 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
423 021540 000010 RDHDR ;READ HEADER
424 021542 004537 013712 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
425 021546 96$: CKLOOP ;CHECK IF /FL:LOE IS SET
426 021546 104006 EMT C$CLP1
427 021550 004537 012602 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
428 021554 ESCAPE TST ;IF /FL:LOE SET LOOP, ELSE EXIT TST
429 021554 104010 EMT C$ESCAPE
430 021556 000036 .WORD L10064-.
430 021560 013737 002174 002242 MOV E.MP,BDDAT ;READ HEADER FOR HEAD SFLECT
431 021566 042737 177677 002242 BIC #177677,BDDAT ;MASK ONLY HEAD SELECT
432 021574 023737 002240 002242 CMP GDDAT,BDDAT ;COMPARE HEAD SELECTS
433 021602 001404 BEQ S$ ;IF EQUAL CONTINUE
434
435 021604 ERRDF 45.,EM55,ERR4
436 021604 104462 TRAP T$ERCODE
437 021606 000055 .WORD 45
438 021610 006402 .WORD EM55
439 021612 010242 .WORD ERR4
436 021614 S$:
437
438 021614 ENDTST ;****END OF TEST****
439 021614 L10064: EMT C$ETST
440
441 .SBTTL **TEST 39** - VERIFY HEAD SELECT 1 VIA RD HDR
442
443 021616 BGN TST ;****START OF TEST****
444
445
446 021616 STARS
  
```

```

447                                     :*****
448                                     :CHECK THAT WE CAN SELECT HEAD SELECT ONE.  ISSUE
449 021616                               :SEEK TO HEAD SELECT 1 AND VERIFY WITH READ HEADER.
                                        :STARS
                                        :*****
450
451
452 021616 012777 000001 160314 99$:  MOV   #MK,@RLDA      ;SET MARKER IN RLDA
453 021624 052777 000020 160306      BIS   #DAHS,@RLDA    ;LOAD HS=1 INTO RLDA
454 021632 004537 013102              2$:  JSR   R5,LDFUNC     ;ISSUE FUNCTION OF FOLLOWING WORD
455 021636 000006                      SEEK                               ;SEEK
456 021640 004537 013712              JSR   R5,WTCRDY     ;WAIT FOR CONTROLLER READY HIGH
457 021644                                CKLOOP
                                        EMT   C$CLP1      ;CHECK IF /FL:LOE IS SET
                                        021644 104006
458
459 021646 004537 012602              JSR   R5,CHERR     ;CHECK CONTROLLER FOR ERRORS
460 021652                                CKLOOP
                                        EMT   C$CLP1      ;CHECK IF /FL:LOE IS SET
                                        021652 104006
461
462 021654 004537 013646              JSR   R5,WTCRDY     ;WAIT FOR DRIVE CLEAR
463 021660                                CKLOOP
                                        EMT   C$CLP1      ;CHECK IF /FL:LOE IS SET
                                        021660 104006
464
465 021662 004537 012602              JSR   R5,CHERR     ;CHECK CONTROLLER FOR ERRORS
466 021666                                CKLOOP
                                        EMT   C$CLP1      ;CHECK IF /FL:LOE IS SET
                                        021666 104006
467
468 021670 004537 013102              JSR   R5,LDFUNC     ;ISSUE FUNCTION OF FOLLOWING WORD
469 021674 000010                      RDHDR                               ;READ HEADER
470 021676 004537 013712              JSR   R5,WTCRDY     ;WAIT FOR CONTROLLER READY HIGH
471 021702                                CKLOOP
                                        EMT   C$CLP1      ;CHECK IF /FL:LOE IS SET
                                        021702 104006
472
473 021704 004537 012602              JSR   R5,CHERR     ;CHECK CONTROLLER FOR ERRORS
474 021710                                ESCAPE
                                        EMT   TST
                                        021710 104010      ;IF /FL:LOE SET LOOP, ELSE EXIT TST
                                        021712 000044      .WORD  L10065-.
475
476 021714 013737 002174 002242      MOV   E.MP,BDDAT    ;READ HEADER
477 021722 042737 177677 002242      BIC   #177677,BDDAT ;MASK FOR H.S.
478 021730 012737 000100 002240      MOV   #RHHS,GDDAT  ;SET EXPECTED
479 021736 023737 002240 002242      CMP   GDDAT,BDDAT  ;CORRECT HEAD
480 021744 001404                      BEQ   5$            ;YES, CONTINUE
481
482 021746                                ERRDF  46.,EM55,ERR4
                                        TRAP  T$ERCODE
                                        021746 104462
                                        021750 000056      .WORD  46
                                        021752 006402      .WORD  EM55
                                        021754 010242      .WORD  ERR4
483 021756                                5$:
484
485 021756                                ENDTST
                                        021756                                ;****END OF TEST****
                                        021756 104001      L10065:
                                        EMT   C$ETST
486
487
488                                     .SBTTL **TEST 40** - VERIFY HEAD SELECT 0 VIA GET STATUS
  
```

```

489
490 021760          BGNTST                      ;****START OF TEST****
491
492 021760          STARS
493                ;*****
494                ;CHECK THAT WE CAN READ BACK HEAD SELECT 0 WITH
495                ;A GET STATUS FUNCTION.  SELECT H.S. 0 WITH A SEEK
496 021760          STARS
497                ;*****
498 021760 012777 000001 160152          MOV      #MK,@RLDA      ;SET MARKER IN RLDA
499                                ;LOAD HS=0 INTO RLDA
500 021766 005037 002240          2$: CLR      GDDAT          ;SET UP EXP'D
501 021772 004537 013102          3$: JSR      R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
502 021776 000006                                SEEK          ;SEEK
503 022000 004537 013712          JSR      R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
504 022004                                CKLOOP          ;CHECK IF /FL:LOE IS SET
505                                EMT      C$CLP1
506 022006 004537 012602          JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
507 022012                                CKLOOP          ;CHECK IF /FL:LOE IS SET
508                                EMT      C$CLP1
509 022014 004537 013646          JSR      R5,WTD RDY      ;WAIT FOR DRIVE READY
510 022020                                CKLOOP          ;CHECK IF /FL:LOE IS SET
511                                EMT      C$CLP1
512 022022 004537 012602          JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
513 022026                                CKLOOP          ;CHECK IF /FL:LOE IS SET
514                                EMT      C$CLP1
515 022030 012777 000003 160102          MOV      #GSBIT!MK,@RLDA ;SET UP FOR GET STATUS IN DA
516 022036 004537 013102          JSR      R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
517 022042 000004                                GSTAT          ;GET STATUS
518 022044 004537 013712          JSR      R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
519 022050                                CKLOOP          ;CHECK IF /FL:LOE IS SET
520                                EMT      C$CLP1
521 022052 004537 012602          JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
522 022056                                ESCAPE          ;IF /FL:LOE SET LOOP, ELSE EXIT TST
523                                EMT      C$ESCAPE
524                                .WORD   L10066-
525 022062 013737 002174 002242          MOV      E.MP,BDDAT      ;READ STATUS FOR HEAD SELECT BIT
526 022070 042737 177677 002242          BIC      #177677,BDDAT   ;LEAVE ONLY H.S. BIT
527 022076 023737 002240 002242          CMP      GDDAT,BDDAT     ;IS HEAD SELECT CORRECT?
528 022104 001404                                BEQ      6$              ;YES, CONTINUE
529 022106                                ERRDF      47.,EM56,ERR4
530 022106 104462                                TRAP      T$ERCODE
531 022110 000057                                .WORD    47
532 022112 006435                                .WORD    EM56
533 022114 010242                                .WORD    ERR4
534 022116          6$:
535 022116          ENDTST                      ;****END OF TEST****

```

```

022116          L10066:
022116 104001      EMT      C$ETST
533
534
535
536
537 022120      .SBTTL  **TEST 41** - VERIFY HEAD SELECT 1 VIA GET STATUS
538
539 022120      BGNTST          ;****START OF TEST****
540
541
542
543 022120      STARS
                    ;*****
                    ;CHECK THAT WE CAN READ BACK HEAD SELECT 1 WITH A GET
                    ;STATUS FUNCTION.  SELECT H.S. 1 WITH A SEEK AND VERIFY WITH
                    ;GET STATUS
                    STARS
                    ;*****
544
545
546 022120 012777 000001 160012      MOV      #MK,@RLDA      ;SET MARKER IN RLDA
547 022126 052777 000020 160004      BIS      #DAHS,@RLDA    ;LOAD HS=1 INTO RLDA
548 022134 012737 000100 002240 2$:  MOV      #STHS,GDDAT    ;SET UP EXP'D
549 022142 004537 013102      3$:  JSR      R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
550 022146 000006      SEEK      ;SEEK
551 022150 004537 013712      JSR      R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
552 022154      CKLOOP      ;CHECK IF /FL:LOE IS SET
                    EMT      C$CLP1
                    022154 104006
553
554 022156 004537 012602      JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
555 022162      CKLOOP      ;CHECK IF /FL:LOE IS SET
                    EMT      C$CLP1
                    022162 104006
556
557 022164 004537 013646      JSR      R5,WTD RDY      ;WAIT FOR DRIVE READY
558 022170      CKLOOP      ;CHECK IF /FL:LOE IS SET
                    EMT      C$CLP1
                    022170 104006
559
560 022172 004537 012602      JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
561 022176      CKLOOP      ;CHECK IF /FL:LOE IS SET
                    EMT      C$CLP1
                    022176 104006
562
563 022200 012777 000003 157732      MOV      #GSBIT!MK,@RLDA ;SET UP FOR GET STATUS IN DA
564 022206 004537 013102      JSR      R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
565 022212 000004      GSTAT      ;GET STATUS
566 022214 004537 013712      JSR      R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
567 022220      ESCAPE      TST      ;IF /FL:LOE SET LOOP, ELSE EXIT TST
                    EMT      C$ESCAPE
                    022220 104010      .WORD    L10067-.
                    022222 000046
568
569 022224 004537 012602      JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
570 022230      ESCAPE      TST      ;IF /FL:LOE SET LOOP, ELSE EXIT TST
                    EMT      C$ESCAPE
                    022230 104010      .WORD    L10067-.
                    022232 000036
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      68            ;YES, CONTINUE
576
577 022260      ERRDF 4R.,EM56,ERR4

```

```

022260 104462          TRAP      T$ERCODE
022262 000060          .WORD    48
022264 006435          .WORD    EM56
022266 010242          .WORD    ERR4
578 022270          6$:
579
580 022270          ENDTST          ;****END OF TEST****
    022270          L10067:
    022270 104001          EMT      C$ETST
581
582
583          .SBTTL  **TEST 42** - TEST TIME AT WHICH DIF WD GETS TRANSMITTED
584
585 022272          BGNST          ;****START OF TEST****
586
587
588 022272          STARS
                    ;:*****
589          ;VERIFY THAT THE DIFFERENCE WORD ON A SEEK IS
590          ;TRANSMITTED PRIOR TO CONTROLLER READY SETTING. THIS
591          ;IS DONE BY SETTING A KNOWN DIFFERENCE WORD IN
592          ;THE RLDA ISSUING A A SEEK, WAITING FOR CONTROLLER READY
593          ;(BUT NOT DRIVE READY), WRITING A DIFFERENT RLDA AND WAITING
594          ;FOR DRIVE READY. THE RESULTANT POSITION SHOULD BE THAT
595          ;OF THE FIRST RLDA ONLY.
596 022272          STARS
                    ;:*****
597
598
599 022272 004537 013102          JSR      R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
600 022276 000010          RDHDR          ;READ HEADER
601 022300 004537 013712          JSR      R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
602 022304          99$:      CKLOOP          ;CHECK IF /FL:LOE IS SET
    022304 104006          EMT      C$CLP1
603
604 022306 004537 012602          JSR      R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
605 022312          CKLOOP          ;CHECK IF /FL:LOE IS SET
    022312 104006          EMT      C$CLP1
606
607 022314 013737 002174 002240          MOV     E,MP,GDDAT          ;READ HEADER
608 022322 043737 002212 002240          BIC     SECMSK,GDDAT          ;CLEAR SECTOR BITS
609 022330 012777 000001 157602          MOV     #MK,@RLDA          ;SET MARKER IN RLDA
610 022336 032737 000100 002240          BIT     #RHHS,GDDAT          ;TEST H.S.
611 022344 001403          BEQ     2$          ;IF ZERO, CONTINUE
612 022346 052777 000020 157564          BIS     #DAMS,@RLDA          ;ONE, SET SO WE WILL REMAIN THERE
613 022354 013737 002240 002232          2$:      MOV     GDLAT,IMPO          ;STORE HEADER
614 022362 042737 000100 002232          BIC     #RHHS,IMPO          ;CLEAR H.S. FROM STORED WORD
615 022370 023727 002264 000001          CMP     T,DRIVE,#1
616 022376 001034          BNE     12$
617 022400 023737 002232 002560          CMP     IMPO,HALMAX
618 022406 101007          BMI     3$
619 022410 052777 000004 157522          BIS     #SIGN,@RLDA
620 022416 063737 002556 002240          ADD     QUAMAX,GDDAT
621 022424 000403          BR      4$
622 022426 163737 002556 002240          3$:      SUB     QUAMAX,GDDAT
623 022434 053777 002556 157476          4$:      BIS     QUAMAX,@RLDA
624 022442 012737 000001 002234          MOV     #MK,IMP
  
```

625	022450	032777	000020	157462		BIT	#DAHS,@RLDA	
626	022456	001037				BNE	SS	
627	022460	052737	000020	002234		BIS	#DAHS,TMP1	
628	022466	000433				BR	SS	
629	022470	023737	002232	002610	128:	CMP	TMP0,HMAX	
630	022476	101007				BHI	138	
631	022500	052777	000004	157432		BIS	#SIGN,@RLDA	
632	022506	063737	002606	002240		ADD	QMAX,GDDAT	
633	022514	000403				BR	148	
634	022516	163737	002606	002240	138:	SUB	QMAX,GDDAT	
635	022524	053777	002606	157406	148:	BIS	QMAX,@RLDA	
636	022532	012737	000001	002234		MOV	#MK,TMP1	
637	022540	032777	000020	157372		BIT	#DAHS,@RLDA	
638	022546	001003				BNE	SS	
639	022550	052737	000020	002234		BIS	#DAHS,TMP1	
640	022556	004537	013102		58:	JSR	R5,LDFUNC	:ISSUE FUNCTION OF FOLLOWING WORD
641	022562	000006				SEEK		:SEEK
642	022564	004537	013712			JSR	R5,WTCRDY	:WAIT FOR CONTROLLER READY HIGH
643	022570					CKLOOP		:CHECK IF /FL:LOE IS SET
	022570	104006				EMT	(SCLP1	
644								
645								
646	022572	004537	012602			JSR	R5,CHERR	:CHECK CONTROLLER FOR ERRORS
647	022576					CKLOOP		:CHECK IF /FL:LOE IS SET
	022576	104006				EMT	(SCLP1	
648								
649	022600	013777	002234	157332		MOV	TMP1,@RLDA	:SEND IN NEW DIFFERENCE WORD
650	022606	004537	013712			JSR	R5,WTCRDY	:WAIT FOR CONTROLLER READY HIGH
651	022612					CKLOOP		:CHECK IF /FL:LOE IS SET
	022612	104006				EMT	(SCLP1	
652								
653	022614	004537	012602			JSR	R5,CHERR	:CHECK CONTROLLER FOR ERRORS
654	022620					CKLOOP		:CHECK IF /FL:LOE IS SET
	022620	104006				EMT	(SCLP1	
655								
656	022622	004537	013646			JSR	R5,WTCRDY	:WAIT FOR DRIVE READY
657	022626				88:	CKLOOP		:CHECK IF /FL:LOE IS SET
	022626	104006				EMT	(SCLP1	
658								
659								
660	022630	004537	012602			JSR	R5,CHERR	:CHECK CONTROLLER FOR ERRORS
661	022634					CKLOOP		:CHECK IF /FL:LOE IS SET
	022634	104006				EMT	(SCLP1	
662								
663	022636	004537	013102			JSR	R5,LDFUNC	:ISSUE FUNCTION OF FOLLOWING WORD
664	022642	000010				RDHDR		:READ HEADER
665	022644	004537	013712			JSR	R5,WTCRDY	:WAIT FOR CONTROLLER READY HIGH
666	022650					CKLOOP		:CHECK IF /FL:LOE IS SET
	022650	104006				EMT	(SCLP1	
667								
668	022652	004537	012602			JSR	R5,CHERR	:CHECK CONTROLLER FOR ERRORS
669	022656					ESCAPE	TST	:IF /FL:LOE SET LOOP, ELSE EXIT TST
	022656	104010				EMT	(BESCAPE	
	022660	000036				.WORD	L10070-	
670								
671	022662	013737	002174	002242		MOV	E.MP,BDDAT	:READ HEADER
672	022670	043737	002212	002242		BIC	SECMASK,BDDAT	:CLEAR SECTOR ADDRESS

```

673 022676 023737 002240 002242      CMP      GDDAT,BDDAT      ;IS HEADER CORRECT?
674 022704 001404                      BEQ      108             ;IF SO BRANCH
675
676 022706                      ERRDF   50.,EM57,ERR4
      022706 104462          TRAP   TBERCODE
      022710 000062          .WORD  50
      022712 006474          .WORD  EM57
      022714 010242          .WORD  ERR4
677 022716                      108:
678
679 022716                      ENDIST
      022716                      L10070:
      022716 104001          EMT    C8E1ST
680
681
682                      .SBTTL  **TEST 43** - EXTENSIVE CHECK OF HEADER CRC
683
684 022720                      BGN1ST
685 022720                      STARS
      ;*****START OF TEST*****
      ;*****
686                      ;MORE EXTENSIVE CHECK OF HEADER CRC. WE WILL SEEK
687                      ;AND READ HEADERS VERIFYING HDR CRC ACROSS THE
688                      ;PLATTER USING THE GROWING 0, GROWING 1, SHIFTING 0 AND
689                      ;GROWING 0 PATTERNS FOR TRACK ADDRESSES.
690 022720                      STARS
      ;*****
691
692
693 022720 012703 002502          BGNSEG  MOV      #SKLST,R3      ;GET LIST OF DIFFERENCE WORDS
694 022724                      BGNSEG  EMT      C8BSEG      ;*****START OF SEGMENT*****
      022724 104004
695 022726                      18:
696 022726 004537 013102          JSR      R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
697 022732 000010          RDHDR
      022734 004537 013712          JSR      R5,WTCRDV      ;READ HEADER
699 022740                      988:  JSR      R5,WTCRDV      ;WAIT FOR CONTROLLER READY HIGH
      022740 104006          EMT      C8CLP1      ;CHECK IF /FL:LOE IS SET
700
701 022742 004537 012602          JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
702 022746                      CKLOOP
      022746 104006          EMT      C8CLP1      ;CHECK IF /FL:  IS SET
703
704 022750 013737 002174 002242          MOV      E.MP,BDDAT      ;READ HEADER
705 022756 043737 002212 002242          BIC      SECMSK,BDDAT    ;CLEAR OUT SECTOR
706 022764 001461                      BEQ      58             ;IF ON TRACK ZERO, M.S. ZERO, JK
707
708                      ;NOT ON TRACK ZERO) CALCULATE DIFFERENCE WORD AND PUT IT BACK
709                      ;ON ZERO.
710
711 022766 042737 000100 002242          BIC      #RHMS,BDDAT    ;CLEAR OUT HEAD SELECT
712 022774 013777 002242 157136          MOV      BDDAT,@RLDA    ;PUT CYLINDER AS DIFFERENCE WORD
713 023002 052777 000001 157130          BIS      #MK,@RLDA     ;SET MARKER BIT
714 023010 004537 013102          JSR      R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
715 023014 000006          SEEK
      023016 004537 013712          JSR      R5,WTCRDV      ;SEEK
717 023022                      988:  JSR      R5,WTCRDV      ;WAIT FOR CONTROLLER READY HIGH
      023022 104006          CKLOOP
      EMT      C8CLP1      ;CHECK IF /FL:LOE IS SET
  
```

718									
719	023024	004537	012602		JSR	R5,CHERR		:CHECK CONTROLLER FOR ERRORS	
720	023030				CKLOOP			:CHECK IF /FL:LOE IS SET	
	023030	104006			EMT	(BCLP1			
721									
722	023032	004537	013646		JSR	R5,WTRDY		:WAIT FOR DRIVE READY	
723	023036			898:	CKLOOP			:CHECK IF /FL:LOE IS SET	
	023036	104006			EMT	(BCLP1			
724									
725	023040	004537	012602		JSR	R5,CHERR		:CHECK CONTROLLER FOR ERRORS	
726	023044				CKLOOP			:CHECK IF /FL:LOE IS SET	
	023044	104006			EMT	(BCLP1			
727									
728									
729	023046	004537	013102		JSR	R5,LDFUNC		:ISSUE FUNCTION OF FOLLOWING WORD	
730	023052	000010			RDHDR			:READ HEADER	
731	023054	004537	013712		JSR	R5,WTRDY		:WAIT FOR CONTROLLER READY HIGH	
732	023060			968:	CKLOOP			:CHECK IF /FL:LOE IS SET	
	023060	104006			EMT	(BCLP1			
733									
734	023062	004537	012602		JSR	R5,CHERR		:CHECK CONTROLLER FOR ERRORS	
735	023066				CKLOOP			:CHECK IF /FL:LOE IS SET	
	023066	104006			EMT	(BCLP1			
736									
737	023070	005037	002240		CLR	GDDAT		:CLEAR EXPECTED	
738	023074	013737	002242	002254	MOV	BDDAT,DWORD		:SAVE DIFFERENCE WORD	
739	023102	013737	002174	002242	MOV	E,MP,BDDAT		:READ HEADER	
740	023110	043737	002212	002242	BIC	SECMASK,BDDAT		:MASK OUT SECTOR BITS	
741	023116	001404			BEW	58		:BRANCH IF ON ZERO TRACK	
742									
743	023120				ERRDF	S1,EM54,ERR3			
	023120	104462			TRAP	TBERCODE			
	023122	000063			.WORD	S1			
	023124	006343			.WORD	EM54			
	023126	010170			.WORD	ERR3			
744	023130			58:	CKLOOP			:CHECK IF /FL:LOE IS SET	
	023130	104006			EMT	(BCLP1			
745									
746	023132	011377	157002		MOV	(R3),@RLDA		:GET DIFFERENCE WORD	
747	023136	052777	000005	156774	BIS	#SIGN.MK,@RLDA		:SET SIGN (TOWARDS SPINDLE) AND MARKER	
748	023144	004537	013102		JSR	R5,LDFUNC		:ISSUE FUNCTION OF FOLLOWING WORD	
749	023150	000006			SEEK			:SEEK	
750	023152	004537	013712		JSR	R5,WTRDY		:WAIT FOR CONTROLLER READY HIGH	
751	023156				CKLOOP			:CHECK IF /FL:LOE IS SET	
	023156	104006			EMT	(BCLP1			
752									
753	023160	004537	012602		JSR	R5,CHERR		:CHECK CONTROLLER FOR ERRORS	
754	023164				CKLOOP			:CHECK IF /FL:LOE IS SET	
	023164	104006			EMT	(BCLP1			
755									
756	023166	004537	013646		JSR	R5,WTRDY		:WAIT FOR DRIVE READY	
757	023172				CKLOOP			:CHECK IF /FL:LOE IS SET	
	023172	104006			EMT	(BCLP1			
758									
759									
760	023174	004537	012602		JSR	R5,CHERR		:CHECK CONTROLLER FOR ERRORS	
761	023200				CKLOOP			:CHECK IF /FL:LOE IS SET	

```

023200 104006          EMT      C$CLP1
762
763 023202 004537 013102    JSR      R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
764 023206 000010          RDHDR      ;READ HEADER
765 023210 004537 013712    JSR      R5,WTCRDY     ;WAIT FOR CONTROLLER READY HIGH
766 023214          CKLOOP   EMT      ;CHECK IF /FL:LOE IS SET
    023214 104006          EMT      C$CLP1
767
768
769 023216 004537 012602    JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
770 023222          CKLOOP   EMT      ;CHECK IF /FL:LOE IS SET
    023222 104006          EMT      C$CLP1
771
772 023224 011337 002240    MOV      (R3),GDDAT     ;GET EXPECTED CYLINDER
773 023230 011337 002254    MOV      (R3),DWORD     ;SET UP DIFFERENCE FOR SEEK
774 023234 013737 002174 002242 8$:    MOV      E.MP,BDDAT     ;READ HEADER FROM RLMP
775 023242 043737 002212 002242  BIC      SECMSK,BDDAT    ;CLEAR OUT SECTOR BITS
776 023250 023737 002240 002242  CMP      GDDAT,BDDAT    ;DID SEEK GO TO THE RIGHT
777 023256 001404          BEQ      9$            ;TRACK, IF SO, GO GET NEXT
778
779 023260          ERRDF    52.,EM54,ERR3
    023260 104462          TRAP    T$ERCODE
    023262 000064          .WORD  52
    023264 006343          .WORD  EM54
    023266 010170          .WORD  ERR3
780 023270          CKLOOP   9$:    EMT      ;CHECK IF /FL:LOE IS SET
    023270 104006          EMT      C$CLP1
781
782 023272 013737 002174 023306  MOV      E.MP,10$      ;GET HEADER WORD
783 023300 004537 013460    JSR      R5,SIMBCC     ;GO CALCULATE HEADER CRC
784 023304 000020          16.      ;16 BITS
785 023306 000000          10$:    .WORD  0            ;HEADER GOES HERE
786 023310 000000          .WORD  0            ;START WITH ZERO CRC
787 023312 013737 002222 023336  MOV      CALBCC,20$
788 023320 013737 002176 023334  MOV      E.MP1,21$
789 023326 004537 013460    JSR      R5,SIMBCC
790 023332 000020          16.
791 023334 000000          21$:    .WORD  0
792 023336 000000          20$:    .WORD  0
793 023340 013737 002222 002240  MOV      CALBCC,GDDAT  ;MOVE CALCULATED CRC TO GDDAT
794 023346 013737 002200 002242  MOV      E.MP2,BDDAT   ;GET HEADER CRC FROM RLMP
795 023354 023737 002240 002242  CMP      GDDAT,BDDAT   ;IS CRC CORRECT?
796 023362 001404          BEQ      11$          ;IF SO CONTINUE
797
798 023364          ERRDF    53.,EM42,ERR4
    023364 104462          TRAP    T$ERCODE
    023366 000065          .WORD  53
    023370 005764          .WORD  EM42
    023372 010242          .WORD  ERR4
799 023374          CKLOOP   11$:   EMT      ;CHECK IF /FL:LOE IS SET
    023374 104006          EMT      C$CLP1
800
801
802 023376 005723          TST      (R3),         ;BUMP PATTERN
803 023400 023727 002264 000001  CMP      T.DRIVE,#1
804 023406 001005          BNE     2$
805 023410 020327 002602    CMP      R3,#$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
    ;:*****
    ;VERIFY THAT WE CAN ISSUE GET STATUS AND RECIEVE
    ;THE STATUS WORD WHILE THE DRIVE IS IN NOTION SEEKING
    STARS
    ;:*****
822
823
824 023440
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 TPACK 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$CLP1
850
851 023536 004537 012602    JSR      R5,CHERR          ;CHECK CONTROLLER FOR FRRORS
852 023542          CKLOOP          ;CHECK IF /FL:LOE IS SET
    023542 104006          EMT      C$CLP1
  
```

```

853
854 023544 004537 013646      JSR    R5,WDRDY      ;WAIT FOR DRIVE READY
855 023550      CKLOOP      ;CHECK IF /FL:LOE IS SET
      023550 104006      EMT    C$CLP1
856
857 023552 004537 012602      JSR    R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
858 023556      CKLOOP      ;CHECK IF /FL:LOE IS SET
      023556 104006      EMT    C$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 002244  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$CLP1
877
878 023644 012777 077601 156266  MOV    #77601,@RLDA   ;GET DIFFERENCE WORD
879 023652 052777 000005 156260  BIS    #SIGN.MK,@RLDA ;SET SIGN (TOWARDS SPINDLE) AND MARKER
880 023660 004537 013102      JSR    R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
881 023664 000006      SEEK
882 023666 004537 013712      JSR    R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
883 023672      CKLOOP      ;CHECK IF /FL:LOE IS SET
      023672 104006      EMT    C$CLP1
884
885
886 023674 004537 012602      JSR    R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
887 023700      CKLOOP      ;CHECK IF /FL:LOE IS SET
      023700 104006      EMT    C$CLP1
888 023702 012777 000003 156230  MOV    #MK!GSBIT,@RLDA ;ISSUE FUNCTION OF FOLLOWING WORD
889 023710 004537 013102      JSR    R5,LDFUNC
890 023714 000004      GSTAT
891 023716 004537 013712      JSR    R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
892 023722      CKLOOP      ;CHECK IF /FL:LOE IS SET
      023722 104006      EMT    C$CLP1
893 023724 004537 012602      JSR    R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
894
895 023730      END1ST
      023730      L10072:
      023730 104001      EMT    C$E1ST
  
```

896					
897	023732			BGNMOD	HRDPRM
898					
899	023732			BGNHRD	
900	023732	000030		.WORD	L10073-LSHARD/2
901	023734			GPRML	CNTMSG,CNT,1,YES
	023734	005130		.WORD	T\$CODE
	023736	024030		.WORD	CNTMSG
	023740	000001		.WORD	1
902	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
903	023752			GPRMA	VECMMSG,VECT,0,0,776,YES
	023752	001031		.WORD	T\$CODE
	023754	024046		.WORD	VECMMSG
	023756	000000		.WORD	T\$LOLIM
	023760	000776		.WORD	T\$HILIM
904	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
905	023774			GPRML	DRTYPE,TYPDR,1,YES
	023774	003130		.WORD	T\$CODE
	023776	024055		.WORD	DRTYPE
	024000	00000		.WORD	1
906	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
907					
908	024014			ENDHRD	
				.EVEN	
	024014			L10073:	
909					
910	024014	102	125	123	CSRMSG: .ASCIZ /BUS ADDRESS/
	024017	040	101	104	
	024022	104	122	105	
	024025	123	123	000	
911	024030	122	114	061	CNTMSG: .ASCIZ /RL11/
	024033	061	000		
912	024035	102	122	040	BRMSG: .ASCIZ /BR LEVEL/
	024040	114	105	126	
	024043	105	114	000	
913	024046	126	105	103	VECMMSG: .ASCIZ /VECTOR/
	024051	124	117	122	
	024054	000			
914	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$SOFT/2
925 024110 GPRMI DMSG,DLT,1,YES
024110 000130 .WORD T$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
024140 L10074: .EVEN
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
024514 .EVEN
948 L$LAST::
  
```

1

.SBTTL DIAGNOSTIC SUPERVISOR -- LOW CORE SET UP

PWR.FAIL:

POWER INTERRUPT ROUTINE

SEQ 0105

35 055310 000000
36 055312 000000
37 055314 000000
38 055316 000000
39 055322
40 000200

.WORD 0
.WORD 0
.WORD 0
.WORD 0
END.SUPV=+.2
.END 200

:SPACE FOR USER POOL POINTER
:SIZE
:CHECKSUM (NOT CURRENTLY USED)
:SIZE OF H.W. PTAB. ALLOCATION

ASSEMBLY ROUTINES
SYMBOL TABLE

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	CYLSK	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		DECMG	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	EM101	=	007640	
ASSEMB=	000011		CALLPS=	000024	C\$BUFF=	000030		DIAGMC=	000000	EM102	=	007705	
ASAAV	031316		CALLSP=	000026	C\$CEFG=	000046		DIAG.T	025046	EM11	=	005126	
ASAAW	031332		CALLTC=	000030	C\$CLEA=	000012		DLT =	000000	EM13	=	005167	
ASAAZ	031344		CAL.CL	052202	C\$CLP1=	000006		DLTMES	003750	EM14	=	005221	
ASAAZ	031352		CAL.TI	052240	C\$CVEC=	000036		DMSG	024140	EM15	=	005247	
ASAAZ	031366		CHERR	012602	C\$DCLN=	000044		DPDVD	054456	EM16	=	005275	
ASABA	031376		CHKLUP	033620	C\$DODU=	000053		DPMUL	054344	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	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	EM41	=	005673	
BINMSG	043770		CLKACC	024754	C\$ETST=	000001		DS0 =	000000	EM42	=	005764	
BIT0 =	000001	G	CLKBFR	052204	C\$EXIT=	000032		DS1 =	000400	EM43	=	006022	
BIT00 =	000001	G	CLKCNT	024752	C\$GMAN=	000043		DS2 =	001000	EM44	=	006121	
BIT01 =	000002	G	CLKJUM	052610	C\$GPHR=	000042		DS3 =	001400	EM45	=	006154	
BIT02 =	000004	G	CLKRES	053612	C\$GPRI=	000040		DUNIT.	024762	EM46	=	006207	
BIT03 =	000010	G	CLKSER	053746	C\$GTIM=	000052		DVC.FT	040042	EM47	=	006242	
BIT04 =	000020	G	CLKSON	025012	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	C\$KWF=	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\$LGOP=	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	C\$PNTB=	000014		D\$AAM	043602	EM61	=	006575	
BIT11 =	004000	G	COMMTA	050074	C\$PNTF=	000017		EF.CON=	000036	EM62	=	006656	
BIT12 =	010000	G	COMP	003762	C\$PNTS=	000016		EF.NEW=	000035	EM63	=	006741	
BIT13 =	020000	G	CONT	012012	C\$PNTX=	000015		EF.PWR=	000034	EM64	=	007022	
BIT14 =	040000	G	CONTCL	053672	C\$POIN=	000040		EF.RES=	000037	EM65	=	007105	
BIT15 =	100000	G	CONTIN	011660	C\$QIO =	000377		EF.STA=	000040	EM66	=	007166	
BIT2 =	000004	G	CRDY =	000200	C\$RDBU=	000007		EF01 =	000001	EM67	=	007251	
BIT3 =	000010	G	CRLF	044172	C\$REFG=	000050		EF02 =	000002	EM7	=	005100	
BIT4 =	000020	G	CRTIM	004602	C\$REQT=	000045		EF03 =	000003	EM70	=	007306	
BIT5 =	000040	G	CSEND	002744	C\$RESE=	000033		EF04 =	000004	EM71	=	007343	
BIT6 =	000100	G	CSPAT	002646	C\$REVI=	000002		EF05 =	000005	EM72	=	007400	
BIT7 =	000200	G	CSR =	000000	C\$RPT =	000025		EF06 =	000006	EM73	=	007433	
BIT8 =	000400	G	CSRMSG	024014	C\$SEFG=	000047		EF07 =	000007	EM74	=	007466	
BIT9 =	001000	G	CSTEST	014356	C\$SPRI=	000041		EF08 =	000010	EM75	=	007520	

ASSEMBLY ROUTINES
SYMBOL TABLE

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	HCRCEM	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	LSAPT	002036 G	L10012	012436
ERCOUN	002750	F\$HW =	000013	HDRLST	013322	LSAU	012512 G	L10013	012504
ERPOIN	002746	F\$INIT=	000006	HERTZ.	031126	LSAUT	002074 G	L10014	012510
ERR =	100000	F\$JMP =	000050	HMAX	002610	LSCCP	002106 G	L10015	012514
ERRFOR	040314	F\$MOD =	000000	HNFMES	003736	LSCLEA	012440 G	L10016	013644
ERRHAN	037114	F\$MSG =	000011	HOLDSP=	000020	LSCO	002032 G	L10017	014062
ERRVEC	002216	F\$PWR =	000017	HPTCOD	011416 G	LSDEPO	002011 G	L10020	014156
ERR.HR	040052	F\$RPT =	000012	HRDPRM	023732 G	LSDESC	002102 G	L10021	014252
ERR.NU	024516 G	F\$SEG =	000003	HW.ADR	024550 G	LSDEVP	002064 G	L10022	014346
ERR.SF	040056	F\$SOFT=	000005	H\$AAB	050606	LSDISP	011446 G	L10023	014466
ERRO	010076 G	F\$SRV =	000010	INIT	024772 G	LSDR	002112 G	L10024	014570
ERR1	010114 G	F\$SUB =	000002	INITCO	011576 G	LSDRCT	002070 G	L10025	014656
ERR1FO	040400	F\$SW =	000014	INITIA	044020	LSDRS	002072 G	L10026	015002
ERR2	010126 G	F\$TEST=	000001	INIT.M	032104	LSDRST	002112 G	L10027	015126
ERR3	010170 G	GARBAG	045344	INIT.R	024606 G	LSDTP	002040 G	L10030	015232
ERR4	010242 G	GDDAT	002240	INPUTA	044746	LSDU	012506 G	L10031	015332
ERR5	010310 G	GETCHR	044050	INTEN =	000100	LSDUT	002076 G	L10032	015422
ERR6	010322 G	GETCMN	047434	INTFLG	002206	LSDVTY	002114 G	L10033	015522
ERR7	010364 G	GETPAR	041126	INTFOR	040244	LSF	002056 G	L10034	015632
ESC.PC	037106	GETSWI	046430	INTSRV	013640	LSFLG	002034 G	L10035	015704
EV.CO	024520 G	GET.TW	046200	INVAL.	031052	LSEXP1	002042 G	L10036	015742
E.BA	002170	GLBDAT	002126 G	INVINT	040102	LSEXP2	002044 G	L10037	016066
E.CS	002166	GLBEQA	002126 G	INV.SW	026104	LSEXP3	002046 G	L10040	016226
E.DA	002172	GLBERR	010076 G	IN.SUF	033054	LSHARD	023734 G	L10041	016366
E.MP	002174	GLBSUB	012516 G	ISAU =	000041	LSHPCP	002016 G	L10042	016572
E.MP1	002176	GLBXT	003650 G	ISCLN =	000041	LSHPTP	002022 G	L10043	016622
E.MP2	002200	GDRVR=	000202	ISDU =	000041	LSHW	011420 G	L10044	017026
FILL	044640	G\$BIT =	000002	ISHRD =	000041	LSICP	002104 G	L10045	017112
FILL.C	000204 G	G\$STAT =	000004	ISINIT=	000041	LSINIT	011576 G	L10046	017256
FIRST	002244	G\$TINT	004452	ISMOD =	000041	LSLADP	002026 G	L10047	017306
FIX	013346	G\$TMES	004413	ISMSG =	000041	LSLAST	024514 G	L10050	017460
FLAGS	024560 G	G\$EXCP=	000400	IS\$PWR =	000041	LSMREV	002050 G	L10051	017546
FLAGS1	024562 G	G\$HILI=	000002	IS\$RPT =	000041	LSNAME	002000 G	L10052	017674
FLAGTA	050012	G\$LOLI=	000001	IS\$SEG =	000041	LSREPP	002066 G	L10053	017716
FLAG.I	031546	G\$NO =	000000	IS\$FT =	000041	LSREV	002010 G	L10054	017776
FLA.SE	047760	G\$OFFS=	000400	IS\$SRV =	000041	LSOFT	024110 G	L10055	020142
FLG.MA	031506	G\$OFSI=	000376	IS\$SUB =	000041	LS\$PC	002062 G	L10056	020300
FND\$NC	013320	G\$PRMA=	000001	IS\$TST =	000041	LS\$PCP	002020 G	L10057	020616
FORM.T	040410	G\$PRMD=	000002	J\$JMP =	000167	LS\$PTP	002024 G	L10060	020654
FREE	045716	G\$PRML=	000000	KBPTR	024624 G	LS\$TA	002030 G	L10061	020720
FRMT1	010752	G\$RADA=	000140	KBUF	024626 G	LS\$W	011436 G	L10062	021044
FRMT11	011244	G\$RADB=	000000	LDCSR	002210	LS\$TIML	002014 G	L10063	021462
FRMT12	011305	G\$RADD=	000040	LDFUNC	013102	LS\$TIMU	002054 G	L10064	021614
FRMT13	011364	G\$RADF=	000200	LF	003760	LS\$TIMI	002052 G	L10065	021756
FRMT2	011012	G\$RADL=	000120	LINE.F	025042 G	LS\$TSTI	002100 G	L10066	022116
FRMT2A	011031	G\$RADO=	000020	LINE1	010422	LS\$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

ASSEMBLY ROUTINES
SYMBOL TABLE

L10072	023730	OSGNSW=	000001	SFTPRM	024106	G	TYPEC	044336	T20	016370	G
L10073	024014	OSPOIN=	000001	SHIFT	054776	G	TYPEPC	040232	T21	016574	G
L10074	024140	PARSES	047506	SIGN =	000004		TYPFLA	047654	T22	016624	G
MAJ.IN	024576	PAR.LA	043474	SIMBCC	013460		TYPLIN	044234	T23	017030	G
MAJ.LO	052206	PASS.C	024530	SIZE =	000004		TYPNUM	043616	T24	017114	G
MAJ.US	024600	PFLG	002202	SKEEND	002644		TYPSTR	044254	T25	017260	G
MAN.TI	001244	PRINTC	045320	SKEND	002602		TYP.ER	040062	T26	017310	G
MAP16	054714	PRINTF	050626	SKLST	002502		TY.UNI	033074	T27	017462	G
MASK.B	033616	PRIOR =	000004	SMSG	024164		TSARGC=	000001	T28	017550	G
MASK.W	033614	PR100 =	000000	SPEC.U	031406		TSCODE=	002130	T29	017676	G
MAXCYL	002256	PR101 =	000040	SPTCOD	011434	G	TSERCO=	000062	T3	014160	G
MAXSEC	002252	PR102 =	000100	SPV.SE	000400		TSERN=	000066	T30	017720	G
MDHEDR	002000	PR103 =	000140	START	011676		TSEXCP=	000000	T31	020000	G
MEM.SI	031154	PR104 =	000200	STARTC	053666	G	TSFLAG=	000040	T32	020144	G
MERLMT	011440	PR105 =	000240	STARTI	011640		TSHLI=	177777	T33	020302	G
MIN.IN	024572	PR106 =	000300	STHS =	000100		TSLOLI=	000000	T34	020620	G
MIN.US	024574	PR107 =	000340	STRCHR	044700		TSLSYM=	010000	T35	020656	G
MK =	000001	PRNTST	045210	STRT.T	031464		TSNEST=	177777	T36	020722	G
MODR	054256	PRO.CM	031460	ST.SET	026316		TSNSK0=	000000	T37	021046	G
MSCRLF	003755	PTAB.S	025000	SUNIT.	031470		TSNSK1=	000005	T38	021464	G
MSG.AD	024540	PUTCHR	044024	SUPERV	027352		TSSAVL=	177777	T39	021616	G
MSG.TY	024514	PWRFLG	002126	SUPFLA	024760	G	TSSEGL=	177777	T4	014254	G
MUL	054212	PWR.FA	055150	SUPV.T	025132	G	TSSEK0=	010000	T40	021760	G
MXSEC1	002250	PWR.FL	024604	SUP.PR	026070		TSSUBN=	000000	T41	022120	G
NEWPRI	053736	PWR.MS	055276	SVCGBL=	000000		TSTAGL=	177777	T42	022272	G
NEXTAR	050176	PWR.SA	055272	SVCHAN	034006		TSTAGN=	010075	T43	022720	G
NODRY	003666	PWR.UP	055274	SVCINS=	000000		TSTEMP=	000000	T44	023440	G
NOOPO =	000000	P.CLK.	031120	SVCSUB=	177777		TSTEST=	000054	T5	014350	G
NOOP7 =	000016	QMAX	002606	SVCTAG=	000000		TSTSTM=	177777	T6	014470	G
NOPINT	004074	QUAMAX	002556	SVCTST=	177777		TSTSTS=	000001	T7	014572	G
NOPMES	004043	RDHDR =	000010	SVHD	002260		TSSAU =	010015	T8	014660	G
NOPWR	011620	READ =	000014	SWCHAN	031300		TSSCLE=	010013	T9	015004	G
NORES	003650	READ.P	052210	SWITCH	050152		TSSDU =	010014	UNITST	002132	
NO.CLK	031102	REGBAC	054700	SW.ADR	024554	G	TSSHAR=	010073	UNIT.D	024532	G
NO.FLA	047772	REGSAV	054664	SW.PTA	031264		TSSHW =	010010	UNI.MA	031410	
NO.LPT	045310	REQN.P	024570	SYS.FT	040032		TSSINI=	010012	USER.P	024774	G
NO.PTA	031306	REQN.T	031462	SLSYM=	010000		TSSMSG=	010007	USER.T	024776	G
NR =	000000	REST	011736	TEMP2	002224		TSSSEG=	010000	UUT	002130	
NUMBIN	040434	RESTMS	013064	TEMP3	002226		TSSSOF=	010074	VALID.	025234	
NUM.LA	040602	RE.SET	026252	TEMP4	002230		TSSSRV=	010016	VAL.LA	026054	
NUM.NO	024556	RHDINT	004267	TERMI	052176		TSSSW =	010011	VAL.SW	031520	
NUM.UN	025164	RHMES	004227	TERMLI	050000		TSTTES=	010072	VECMG	024046	
NUNITS	033572	RHMS =	000100	TERMTA	043762		T.CNTL	002266	VECT =	000002	
NXM =	020000	RLBA	002136	TEST.M	031420		T.DRIV	002264	WCKINT	004166	
NXMES	003716	RLCS	002134	TIMFLG	024750	G	T.SIZE	011442	WCKMES	004126	
NXT	011670	RLDA	002140	TIM.CO	024602	G	T1	013770	WHY	002262	
NXTFOR	050252	RLMP	002142	TIM.OP	040406		T10	015130	WIDTH	041002	
NCTMSG	043776	RL2	002604	TMPFNC	002270		T11	015234	WRCHK =	000002	
OKHDR	013332	RSTACK	054140	TMPO	002232		T12	015334	WRITE =	000012	
OPJ =	002000	SAVEDO=	026450	TMP1	002234		T13	015424	WTCRDY	013712	
OP.ERR	003770	SEARCH	046146	TMP2	002236		T14	015524	WTDY	013646	
OP.MES	003723	SECMSK	002212	TOO.MA	043742		T15	015634	XEQDIA	054024	G
OSAPTS=	000000	SEEK =	000006	TRP.LG	002204		T16	015706	XEQSUB	054012	G
OSAU =	000001	SEGSTA	025014	TRPHAN	013632		T17	015744	XEQ.CL	033534	
OSBGNR=	000000	SEKINT	004361	TST.AB	033730		T18	016070	XEQ.CM	031044	
OSBGNS=	000001	SEKMS	004330	TST.TO	026132		T19	016230	XEQ.IN	033216	
OSDU =	000001	SET.MA	031672	TYPDR =	000006		T2	014064	XEQ.LA	027306	

ASSEMBLY ROUTINES
SYMBOL TABLE

MACRO V03.01 9-FEB-79 18:53:41 PAGE 156-4

F 9

SEQ 0109

XEQ.OP 033310
XEQ.PR 026510
XEQ.TE 033354
XPOLV 002214

XTIME 052676 G
XTIMEN 053522
XTIMST 052720
XNDP.D 031064

XXX 011720
XSALWA= 000000
XSALS= 000040
XSOFFS= 000400

XSTRUE= 000020
SBREG 031560
SENDAD 053776 G
SSAV2 055042 G

SSAV3 055056 G
SSAV4 055074 G
SSAV5 055114 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-#SVCR7/M,CZRLGA,DOCTOR